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[From the Journal of the Franklin Institute.]

The Use of Pulverized Fuel.*

By Lieut. C. E. DUTTON, U. S. Ordnance Corps.

HAVING been invited by Messrs. WHELPLEY & STORER, of Boston, to visit their establishment, and examine their new method of applying fuel to metallurgical and other purposes, I have been so profoundly impressed with the results of the experiments witnessed, that I take the liberty to lay before the Society a discussion of the subject. Their method consists in pulverizing the coal to an extreme degree of fineness, and blowing it into the combustion chamber, where it is ignited and burned in the air which floats it.

The generic idea involved in this process is not new, for it has, during the last forty years, been made the subject of numerous patents in England,† and possibly elsewhere. But to most practical minds it will certainly appear to be new, and will at first receive the hasty judgment passed upon new ideas. Yet nothing can be more certain than that the principles upon which are based the claims of superior economy and efficiency in this mode of utilizing fuel, are entirely sound, and are demonstrable by well known laws of thermodynamics, and by practical considerations familiar to every educated engineer. Although known to some of the highest class of engineers, and considered by them as "theoretically" sound, yet it has received particular attention in but few cases, owing to the want of practical means of carrying it into effect. The invention of Messrs. WHELPLEY & STORER has overcome this practical difficulty in a manner so surprising and complete that it seems well worthy of being ranked in importance and value with the discoveries of BESSEMER and SIEMENS. The defect which has hitherto rendered this valuable idea a practical nullity has been the want of a contrivance for pulverizing coal with uniformity and cheapness. It needs but a moment's reflection to be satisfied that crushing by stamps, or by rolls, and grinding with stones, would cost far more than the best results we could hope to gain—let alone the difficulty of transvecting the dust from the pulverizer to the furnace—a matter no less important than pulverizing itself. Let us see how the invention in question annihilates these difficulties.

Conceive an ordinary blowing fan with the following modifications. The box is about 18 inches diameter, and about the same length. Instead of opening at both ends, one end is tight around the journal. The box is divided into two chambers by a diaphragm, so that, really, we have two fans on the same shaft, and their boxes communicate by a hole in the diaphragm around the shaft. The fan at the closed end of the box is, in form and function, a blowing fan. The outer fan is the pulverizer. The coal is fed into the open end of the pulverizing chamber, is caught by the swiftly revolving paddles, and reduced to powder, and is then sucked by the fan through the diaphragm, whence it is expelled by the ordinary tangential pipe along with the blast. The coal is fed in the form of coarse gravel; it is delivered as fine as flour.

The mere statement of the facts in the case at first appears singular. Had any person, who never saw or heard of this contrivance before, been asked to give his opinion as to what would be the result of feeding coal into such an apparatus, he surely would not have predicted the results actually obtained. It would have been quite natural to expect a little splintering of the coal, and the speedy clogging of the pulverizing chamber, or perhaps the destruction of the whole machine in its efforts to clear itself of its contents. But as the truth is quite otherwise, we may well ask by what kind of action is the coal reduced to powder? It is not ground, for the machine is expressly constructed to avoid a grinding action, the paddles being in no case nearer to the walls of the cylindrical shell than half an inch; nor does the coal seem to be comminuted altogether by splintering against the iron surfaces, for although such action undoubtedly takes place at first impact, yet when it has reached a certain stage, and that by no means near the ultimate one, it cannot seemingly continue to any material extent. The only explanation occurring here, and that not at all satisfactory, is, that in the powerful commotion produced by the swift rotation of the paddles, the particles clash fiercely together and triturate each other—a view confirmed in some measure by the appearance of the dust under the microscope. But whatever the mode, it is certain that the coal is pulverized to an extreme degree. I have watched this machine for hours and have caused it to be fed under my own eye, and the products collected in a bag, of which I submit a sample. As nearly as I can estimate by microscopic measurement, fully nineteen-twentieths of the particles are less than 1-500 of an inch in diameter, and none exceed 1-150 of an inch. From the open end of the pipe it floats away in a dense cloud of smoke, and, singularly enough, not a black smoke, but of a reddish brown color, differing strikingly from the jet black of coal. This may, or may not, indicate extreme minuteness of subdivision; I offer no explanation of it. The still more astonishing performance of this machine in reducing quartz, ores, grain, etc., will be alluded to hereafter.

The function performed by this machine is a double one. It pulverizes the fuel, and delivers it, along with the blast, into the combustion-chamber, by a single and indivisible operation. This combination of two acts into one is of vital importance, and may be said to constitute the central idea of the mechanical part of the process. It would otherwise be useless for metallurgical or even for calorific purposes. It removes at a single *coup* the two most formidable obstacles which have hitherto rendered the use of pulverized fuel impracticable. Another feature of high importance is the mechanism for regulating the supply of air and coal. The inventors have devised an excellent apparatus for this purpose, which controls both with precision; but as this is merely a matter of mechanical detail, I presume it will be taken on trust, and a description of it is omitted. I shall confine myself to a description of the functions performed by it, which are greater than would at first appear. The pulverizer seems to be governed by very definite laws, and a precise practice, in the amount of work it can perform with economy. A machine, working upon a given fuel, will have its efficiency modified by three variable conditions:

1st. The velocity of the shaft.
2d. The quantity of coal introduced.
3d. The quantity of air introduced.

1. With regard to the first condition, practice has shown that there is a uniform, or nearly uniform, velocity suitable to every machine, which may be set down at about 10,000 feet per minute for a point on the periphery of the paddles, which, for an 18-inch pulverizer, would be about 2100 or 2200 revolutions per minute. If the speed be diminished, then the coal will be less thoroughly pulverized, and will burn imperfectly and wastefully in the furnace. If the speed be increased, the fineness of the dust will also be increased, but the power required to attain a higher velocity increases in a very large ratio, and the increased fineness of the product is not sufficiently advantageous to compensate the cost of increased speed.

2. The feed of fuel will of course be determined primarily by the requirements of the furnace, and the minimum quantity which will effect the desired temperature will, in each case, be determined experimentally. If the fuel be diminished, an insufficient heat will be obtained, and if it be increased, the loss will be threefold: (1) the surplus fuel will burn to waste; (2) the effort of the machine to clear itself from an overwhelming supply will absorb more power; and (3) drive out the coal before it is sufficiently pulverized—in brief, the result being, more power and more fuel consumed, and less heat developed.

3. The amount of air admitted should be sufficient to float readily the pulverulent coal, but not more. If excessive, the increased draft through the pulverizing chamber will float out much larger particles than can burn efficiently. Generally speaking, it is advisable to keep the supply of air quite small. In any event it will be necessary to supply air for combustion by a separate air-pipe, because, if a sufficient quantity were passed through the machine, it would carry out the fuel insufficiently reduced, and moreover, in special applications it becomes necessary to use hot-blast, which would necessarily enter the furnace through a separate pipe—the air from the pulverizer being always cold. Air enters the pulverizer through the same inlet, and along with the coal. The aperture is adjustable, as is also the feeding apparatus, thus affording perfect and instantaneous control over the supply of both. The advantage of being able to stop a fire completely in an instant, and renew it in full force as quickly, and also to regulate it at pleasure, by the mere motion of a valve, or hand-lever, is so great as to need the merest mention, in order to be appreciated.

The pulverizer has been applied by its inventors to a variety of purposes, of which I shall discuss two, which seem to afford the widest range for possible advantages, namely, its application to the reverberatory furnace and to the steam boiler.

I. *Pulverized Fuel in the Reverberatory Furnace.*—This application does not involve a radical change in the structure and design of the furnace; the chief alteration being the omission of the fire-place in its present form. Instead of constituting a large proportion of the entire structure, and of prime importance, it is reduced greatly in size, and performs subsidiary functions. It is employed, at first, to raise the temperature of the walls to redness around the coal tuyere, which is necessary in order to ignite the dust as it enters the furnace. Subsequently it is kept closed as tightly as possible, and the fuel within it serves merely to deoxydize the air, which filters through the doors, and to supply a small quantity of carbonic oxide. This small supply of inflammable gas materially assists and insures the speedy ignition of the coal dust.* The gas generator is supplied with anthracite culm, of which it consumes only about 30 pounds per hour. The pulverizer is located a few feet behind the gas generator, and the coal tuyere enters the back wall of the furnace, pointing directly over the fire-bridge. The air tuyere is located just above the coal tuyere. The furnace, therefore, is reduced to a hearth, with the pulverizing machine in the stead of the old fire-place.

In discussing the comparative theoretical merits of this method, and grate-burning, some preliminary considerations may be proper. It is necessary to be mindful of the fact that the amount of heat, that is to say, the number of units of heat, developed by the complete oxydation of a given quantity of fuel, of a particular constitution, is a constant quantity. It matters not under what circumstances oxydation takes place, whether explosively, as in the case of commingled gases, or by that slow combustion which sometimes requires years to accomplish, the gross amount is always the same. But we are dealing chiefly with *temperatures* in the reverberatory furnace—a matter in which quantity of heat is only one of several equally essential conditions, any one of which may be so varied as to occasion the widest variations in temperature. Thus, the increment of temperature produced in a body of gas by the accession of a given quantity of heat, will vary inversely as the volume of that gas—also inversely as the specific heat of the gas. Hence it appears that if we increase the volume of gas (or solid either), through which the heat is to be diffused, we diminish the temperature; or if we impart given quantities of heat to given volumes of gases, the temperatures will vary inversely as the specific heats of the gases. These facts are familiar enough to every student of thermodynamics, and are mentioned merely for the sake of continuity in the argument.

II. For the complete combustion of a fuel of a given constitution, a fixed proportion of air is necessary. When the combustion is complete, we have obtained certain gases, having a definite volume, an average specific heat, and a fixed temperature, which is the maximum temperature which that fuel is capable of imparting. This assumes, of course, that no adventitious heat is added. If an excess of air be supplied, then that excess represents a useless volume, through which the total heat must be distributed, with a consequent lowering of the temperature. If air be deficient, then the fuel will be imperfectly burned, becoming carbonic oxide instead of carbonic acid, and yielding much less heat, with about the same volume of gas, and a consequent lower temperature. We approach the maximum temperature in proportion as we approach the exact proportions of air and fuel necessary for perfect combustion. In common grate burning we depart widely from exactitude in these proportions. At one period we have a grate heaped with fresh fuel, giving off half-burned, or wholly unburned, gases; at another, half-exhausted coals, coated with ash, to which only a portion of the oxygen can obtain access. The draft, on the other hand, is constant, or only occasionally varied. A stream of air, driven through a bed of ignited coals, first oxidizes the lower layers, converting the carbon it touches into carbonic acid. The latter gas, rising through the bed, takes up more carbon, becoming carbonic oxide, which is, in part, re-oxidized again just above the coals, giving rise to flames. Unless there is a large excess of oxygen, there is a probability that some of the combustible elements of the gases will be unconsumed, owing to imperfect intermixture, and a rapid cooling below the point necessary to insure ignition by the nearly exhausted oxygen. If hydrogen be present in the form of hydrocarbon vapors, it will, by its stronger affinity appropriate oxygen, to the exclusion of carbon, and even decompose carbon already oxidized, the latter element passing off in minute flakes, which constitute the dense black smoke always abundantly developed where bituminous or hydrocarbon fuels are burned in an insufficient supply of air. In the puddling furnace these circumstances are more or less modified by admitting a draft over the grate, but the loss of fuel is by no means wholly obvi-

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* A paper read before the Franklin Institute, at its stated meeting April, 1871. Being an examination of the method of applying pulverized fuel to furnaces and boilers invented by Messrs. WHELPLEY & STORER.

† In the year 1831, one J. S. DAWES took out an English patent for applying pulverized fuel to the blast furnace through the tuyeres. It proved unsuccessful, owing doubtless to the fact that the agency of fuel in the blast furnace is chemical as well as physical. In 1846 a patent was taken out by one DESBOISSERES, for pulverizing fuel, and blowing the dust into the furnace, but though the conception involved some correct ideas, the machinery was totally impracticable.

In 1854, MOUCHEL suggested the injection of powdered fuel and ores, either separately or together, upon a hearth, or inclined plane of a cast-iron box, heated by waste heat from other furnaces.

MUSHET proposed, in 1856, to use pulverized coal, carried by the blast into a reverberatory furnace, to prevent the oxydation of the iron. Other intermediate inventions have been patented in England, but no progress made, owing to the difficulty of pulverizing.

* It will readily appear that the lambent form of a genuine gas flame is better suited to communicate ignition than the scintillations or specks of fuel, where the flame whould have to leap from grain to grain, over an intermediate space of cool or half heated air. It renders ignition more prompt and certain.

ated by this means. In practice, it is usual to drive through the grate at least twice the quantity of air theoretically necessary to oxidize the entire mass of fuel. Indeed, two to one is oftener exceeded than fallen short of. The effect upon the temperature is corresponding, as will appear from the following simple estimates. If a pound of bituminous coal were perfectly burned in a volume of air just sufficient to oxidize all of the combustible elements, the result would be as follows: After deducting the latent heat of vaporization, there would be developed about 13000 units of heat. The resulting gases would occupy (if their temperature were reduced to 60°) 146·6 cubic feet, with an average specific heat of ·26. Their temperature would therefore be $T = \frac{13000}{11{\cdot}22 \times {\cdot}26} + 60° = 4516°$; provided no heat were lost by radiation. If twice the volume of air were used, then $T = \frac{13000}{22{\cdot}44 \times {\cdot}24} + 60 = 2474°$; or a little more than half the temperature under the first supposition. Assuming the air to be fifty per cent. in excess, then $T = \frac{13000}{16{\cdot}83 \times {\cdot}25} + 60 = 3150°$.

Now, it needs but to state the conditions under which pulverized fuel is supplied to the furnace to make it very clear that those conditions are extremely favorable to combustion with a greatly reduced supply of air. We have shown good reason why the enormous excess of 100 per cent. is generally necessary in grate burning. But with pulverized fuel the conditions are radically changed. There, every particle of fuel enters the furnace surrounded by, and in contact with, the very oxygen that is to burn it. The fuel and the air are as perfectly intermixed as possible by the powerful agitation of the pulverizing machine, and at the moment of ignition the former exposes an enormous surface to the action of the latter. The combustion should therefore be rapid, and very nearly complete, and this without the liability to distil a large portion of gases, or to appropriate carbon from other parts of the fuel less exposed to oxidizing action. Perfect intermixture is essential to perfect combustion. When a current of gas and one of air are brought together, it requires time to mingle them perfectly, and if they are ignited at the junction of the jets, some of the gases will escape combination, though the proportions of each may be exact; for the two are carried forward in eddying currents and whirls, which cannot intermingle until some time after they have cooled down below the temperature of ignition. Hence, we have carbonic oxide, free carbon, oxygen, all escaping from flues and stacks without undergoing combination, and representing so much lost fuel, and adding to the superfluous volume of gases besides. But with pulverized fuel the essential condition of intermixture is vastly improved, so that we seem to approach that perfect intermixture obtained by the transfusion of gases where atom is in juxtaposition to atom, and we are removed from it only sufficiently to avoid the explosive action attending the contact of flame with perfectly mingled gases. More strictly, the condition of pulverized fuel, sustained in air sufficient to burnit, may be represented by a cube of air 1-25th of an inch on its edge, holding in its centre a particle of coal.

Now, it is not maintained that these conditions are in their nature such as to insure the perfect combustion of the coal with the theoretical minimum of air, for it is possible to detect circumstances which may, in a greater or less degree, interfere with such result. It must be borne in mind that these particles are not atomic by a very wide interval, and hence their combustion must present the phenomena of progressive absorption of a surface of fuel, and a progressive exhaustion of oxygen; and, as is invariably the case under these circumstances, some minute portions, at least, must escape combustion, unless oxygen be in excess. Then, too, some of the particles are of material size, rendering these phenomena all the more decided. But, on the whole, it certainly seems as though the conditions in question were such that coal, pulverized in the manner described, may be perfectly burned in a supply of air not greatly in excess of the theoretical minimum. At any rate, they are far more favorable in this respect than the best possible method of grate burning, and probably better than any practical existing method of gas burning.

A prolific source of loss exists in the ordinary reverberatory furnace, which is obviated in great part by Messrs. WHELPLEY & STORER's method, viz: the loss by radiation from the fire-place. Of the heat generated, only that portion exerts any useful effect which is carried into the hearth. A very sensible amount is lost, however, before the flames enter the hearth. This amount is variously estimated by different investigators, none of whom place it lower than five or six per cent. This need not seem surprising when it is remembered that the area of the surfaces surrounding the fire-place through which heat may be totally lost, amount to one-third, at least, of that of the hearth itself. Also, at very high temperature heat is radiated and conducted away with a rapidity much greater than that due to a simple ratio of the interior to the exterior temperature. This loss is doubly serious, from the fact that the temperature of the flame, at its hottest point, is conveniently near to that required in the bath of metal itself. The pulverized fuel furnace, on the other hand, does away almost entirely with the fire-place, and burns its fuel with nearly explosive rapidity, in the hearth itself, avoiding this loss almost completely.

These results may seem surprising to practical men, and yet they may rest assured that they are in perfect conformity with well established facts and principles in physical science. It is not proposed to obtain any more heat out of the combustion of a quantity of coal, but merely an increased temperature from the same quantity by diminishing the volume of gas through which that heat is distributed. We also burn the fuel more completely, and lose less heat by radiation. With this increased temperature we increase the efficiency and rapidity of all operations requiring the acquisition of temperature, and thus shorten the time during which we are compelled to burn the fuel. Let us therefore apply this deduction of increased temperature to the practical management of the reverberatory furnace.

(To be continued.)

KANAWHA VALLEY, WEST VIRGINIA, June 10, 1871.

TO THE EDITOR—Sir: Your reference to the recent report of Captain J. ARNOLD, Jr., on his experiments with bituminous coals at Springfield Armory, and your endorsement of the Cumberland coal as superior to all others tested, for steam purposes, induce me to send you a brief note on the coals of the Kanawha Valley.

I am now examining this most remarkable and interesting coal field. Well did Professor ROGERS, years ago, report: "On the Great Kanawha, the exposure of coal is one of the most extensive and valuable anywhere in the United States." The astonishment of Professor ANSTED, the distinguished English geologist, who visited this valley in 1855, was markedly expressed. He estimated, in his report to an English company, that coal could be mined at the rate of 550,000 tons to the acre.

The Kanawha coal field (and I use this as a general term), produces several varieties of coal—bituminous, semi-bituminous, splint and cannel. These are alike excellent in quality and incalculable in quantity. I cannot at this time enter into a general description, but will give a few facts as they at present occur to me.

I have not at hand the result of some recent experiments testing the steam-generating power of these coals, but can safely say they exceed in this respect any you name as experimented on by Captain ARNOLD. Some of these coals are specially rich in volatile matter. The celebrated CAMPBELL's coal yields carbon, 55.76; volatile matter, 32.44; ash, 11.80. Some from the Guyandotte yield carbon, 71.88; volatile matter, 26.20; ash, 4.32. Others give still higher percentages of carbon. The splint claims special attention, from its superior adaptability to smelting iron ores. It is an actual substitute for charcoal, and must supplant the slow and tedious process of using carbonized wood in the manufacture of iron. To the energetic manufacturer who should witness, as I did, a few days since, in coming up the Ohio, long trains of huge wagons filled with charcoal, on their winding way from Kentucky to Ohio, for the use of furnaces, the relief presented in splint coal must seem great indeed.

I make the prediction that this peculiar variety of coal will come into general use so soon as it can be brought to market. Already some of the furnaces in the iron region of Ohio and Kentucky have been remodelled to use this coal. At Ashland and Ironton these changes are now going on. A twenty-ton furnace at the latter place has recently been or is now undergoing transformation into one of sixty-tons capacity. I refer to that of Messrs. NORTON. A great change is about to be wrought in this most interesting region. The material wealth which has been so completely locked up, is about to be opened to the enterprize of the world. The speedy completion of the Chesapeake and Ohio Railroad is working great changes in the entire region traversed. Track-laying has commenced at the mouth of Coal river, where the new city of St. Albans has been located, and the work will proceed east and west, until the whole western division, from the Falls of the Great Kanawha to the Ohio, about one hundred miles, shall be finished. It is the intention of the company to have this division in good running order by August or September at farthest.

The Chesapeake and Ohio Railroad passes through the richest portion of the Kanawha coal field, and also through the vast deposits of iron ores further east. Soon we shall see these two great mineral deposits—the future source of incalculable wealth—properly developed. Capitalists are already coming here to invest. Some of the substantial Pennsylvania iron and coal men have leased, and much property has changed hands. The inducements for legitimate operations and investments are unusually great and attractive. It is estimated that pig-iron can be produced in West Virginia, along the line of the Chesapeake and Ohio Railroad, at one-half the cost in Pennsylvania. Let capitalists look to these important facts.

GEOLOGIST.

THE writer of the card signed "Fides," in another column, page 407, is a responsible person, and the gentleman for whom the situation is wanted is favorably known to many of our leading merchants and bankers.

Consumption of Gold and Silver.

THE sales of silver in New York, for consumption by manufacturers of silver-ware, including bars of refined, and Mexican dollars, are said to aggregate $5,000,000 annually. Including the consumption of precious metals by manufacturing jewellers of all sorts, this aggregate is increased several-fold, the estimate of New York being alone $15,000,000; that is to say, $5,000,000 in silver and $10,000,000 in gold; and this is exclusive of what is known as "rolled stock," or ribbons. The fact is asserted that there is more silver used for domestic purposes in the United States than any other country in the world.—*Exchange.*

THE Tredegar Iron Works, at Richmond, Virginia, now turn out five tons of iron to one before the war, and last year manufactured 17,000 tons of wrought and cast-iron, in addition to implements, bringing $2,000,000 to the city of Richmond. They work from 800 to 1000 hands, and have capacity for from 1500 to 2000.

MINING SUMMARY.

California.

The *Scientific Press* of June 10th, contains a letter descriptive of the Kearsage Mine, from which we take the following:

INYO COUNTY.

A tramway, 1500 feet in length, has been built down the mountain side, at an incline of 38 deg., to a point about 500 yards from the mill, for the purpose of delivering the ore. Thence it is loaded in wagons and hauled and dumped into the battery room. The estimated cost of delivery from the mine to the mill is 50 cents per ton. Formerly it cost $15 per ton to get the ore to the same place.

The tramway is a double rail with a switch in the center of its length for one car to pass the other; the cars are built on a new plan, (new to me at least,) having the outside wheels of each car with double flanges, which enables them to take the switch with an accuracy which seems wonderful when seen approaching at such a speedy rate as they generally travel down the mountain. The engineer, Mr. THOMPSON, of Virginia City, has added another feather to his cap, by the successful manner in which he has been able to accomplish this work. All the machinery of the mill has been thoroughly overhauled by competent mechanics, and is now ready to start up. The mines are being worked, and excellent rock was being delivered in the dump house before I left. This cluster of mines has always been considered to be among the best in our county—but heretofore work has been done at such a disadvantage that it has taken ore of almost fabulous richness to pay the expense of working. It is now the intention to work all the quartz contained between the walls (making a body of an average thickness of four feet), the lowest assays of which are $27.50 per ton, and Mr. WINTER assures me that he can mine and reduce rock with his present facilities for $9 per ton, or at a cost of one-half of the lowest assay of his ore. On the other hand there is a vast amount of rock in the mines that assays from $100 to $2000 per ton.

Some $40,000 have been expended on the above improvements since the 1st of April, and considering the inaccessibility of the locality and the immense amount of labor performed, it seems almost an impossibility that it should have been completed in such a short space of time. I have a statement from the very best of authority that there is now at least one and a half millions of dollars worth of ore in sight and ready for extraction. A few weeks ago, a party of mining experts and engineers paid a visit to this mining property, in behalf of an English company, with the view of negotiating the purchase of the same. The owners put a price upon the property, but stated at the same time that the work would progress without reference to the likelihood of a sale being made, as they were perfectly satisfied with their prospects of a fortune.

If this company should conclude to purchase the Kearsage property, it is the intention of Mr. VAN GORDER and Gen. WINTERS to invest in other mining enterprises in this county. So, rather than otherwise, I should like to see the sale made.

I will give you the results of this company from time to time as I receive them, as I think upon it depends, in a great measure, the prospects of Inyo County.

We take the following from the same source:

GOLD MINES NEAR THE CALAVERAS BIG TREES.

There is no mining field which offers greater inducement for the investment of capital than the western slope of the Sierra Nevada. The wonderful productiveness of such mines as the Amador and the Eureka in the great depth reached, the late successful working of claims formerly abandoned as worthless, and the discovery of other rich lodes, are bringing the auriferous quartz veins of this region into prominent notice.

A recent discovery near the Big Trees in Calaveras county is likely to take rank among the first mines in the State. The veins here present many striking features of interest, and seem to answer in the fullest degree the definition of true fissure veins, "fissures proceeding from indefinite depth and filled from below, by chemical processes, with matter differing in nature from the country rock." Like many of the most noted veins of the world, they occur in fissures which have been opened in the earth's crust by the rending asunder of the rock formation across its stratification.

The country rock is slate. This contains numerous dikes of traps, porphyritic greenstone, etc., occupying fissures which run transversely across the slate. The igneous character of the dikes denotes that these rents extended down to the fiery interior of the earth. The gold bearing lodes are found in precisely the same kind of fissures, which is certainly suggestive of their origin. Moreover, the nature of the deposits denotes that they were formed under conditions possible only in fissures extending into the deep interior of the earth, and hence comes an assurance of their permanency.

There are here several parrallel fissures, nearly vertical, having a course of North 40° E., with very solid and smooth walls, and from five to twelve feet wide. In these occur the quartz veins, the quartz occupying only a portion of the space (three to nine feet), the balance being filled by an accompanying vein matter differing from the country rock, and not found outside of the fissure walls. The whole of this vein matter is full of base metals, particularly the sulphurets of iron, deposited in a way that indicates a previous state of solution or possibly vapor; for besides being disseminated throughout the body of the rock, the faces of broken pieces, which had no seams visible to the eye, are often found coated with particles of metal, forming flakes that can be removed with a knife blade.

All of this material contains some gold, but the pay rock proper occurs in chutes of a peculiar kind of quartz which is held by many of the miners to belong to the true chimneys of the precious metals. It is so thoroughly impregnated with the various base metals, especially the sulphurets of iron, lead and zinc, that not an ounce of it can be found destitute of these. The gold is diffused in fine particles through the ore, as if an element of its composition.

The ore of these lodes is of high grade. The Calaveras Gold Mining Company, whose mines are situated here, lately had five tons, taken as an average sample from a dump of several hundred tons, worked in the Angel Co.'s mill, and obtained a yield of $50 80 by simple treatment in a wet battery. The company own three lodes, all situated convenient to one mill, with abundance of pure water and an inexhaustible supply of timber near the mines. They are now erecting a twenty-stamp mill, which will be finished about the 1st of July.

Much the larger number of gold-bearing quartz veins throughout the mining region belong to the pocket class. In these there are no regular paying ore chutes. The gold they may contain seems an accidental deposit. As a rule, such do not pay to work. But they are said to be easily distinguished from the former class by the absence of the base metals and by the appearance of the quartz.

Nevada.

The Gold Hill *News* of the 12th says that in the Virginia Consolidated Mines prospecting, both north and south, at the 500 foot level, from the new shaft, is being vigorously prosecuted with but little water to interfere with operations. Some good looking quartz is encountered in the north drift.

CHOLLAR-POTOSI.

Quite a jump or reaction has taken place in the stock of this mine, advancing about $10 a share within the last two days, as may be seen by reference to our regular stock report. This sudden rise is said to be based upon new ore developments. The mine looks very well indeed yet, and will yield plenty of good paying ore for some time. The Belvidere section contains many hundred tons yet to be extracted, and there is also considerable in the Blue Wing, D street tunnel and other sections, also at points just north and south of the Belvidere section. Vigorous prospecting is being done at various points. The mine is yielding about 200 tons of ore per day, and making very good bullion shipments, that of day before yesterday amounting to $86,000. The present monthly dividend of $2 per share is payable day after to-morrow.

HOISTING WORKS ACCIDENT.

About 11 o'clock A. M. to-day, a cage with a car load of ore was being hoisted at the old upper Savage works, when somehow it got stuck fast in the shaft, causing the sheave or pulley at the top of the hoisting frame to give way and come down with a terrific crash. The main spur wheel of the hoisting gear and some other smaller pieces of the machinery were broken, but fortunately no one was hurt or any very serious danger done. The cage, being of the safety pattern, caught all right, and did not drop to the bottom, as it would otherwise have done, cable and all. It will not take long to repair damages and have things working as before.

GOULD AND CURRY MINE.

Good progress is being made in the extensive preparations now under way at the lower level of the mine for the further sinking of the main shaft, says the Virginia *Enterprise* of June 1st. The excavations for the tank-pits, at the lower depths of the shaft, are approaching completion. The arrangements for pumping the large volume of water anticipated, as the shaft penetrates the vein, are on a scale of great magnitude. The lowest constructed reservoir will be forty feet in length and of sufficient capacity to retain the superabundant water during every temporary suspension of the operation of the machinery. The new wire rope is now in place, and gives perfect satisfaction. This cable is five inches wide and half an inch in thickness; it is 1,600 feet in length, weighs over three tons, and will serve to sink the shaft a further distance of 300 feet, or until the west wall of the vein is reached. We are informed by a gentleman of much practical experience and scientific knowledge that the stratification of the lode, so far as exposed in the descent of the shaft, below a point 900 feet from its top, closely resembles that of the rich lateral veins in Mexico, which are generally more extensive and valuable than the first explored deposits.

Montana.

From the *Rocky Mountain Gazette*, of June 5th, we take the following: The camp at Radersburg and Keatingville presents an animated appearance. There must be at this time at least three hundred men engaged in quartz and placer mining. All the waters in Quinn's ditches is used on the bars and in the gulches, and although the pay is not large, yet it is believed that fair wages will result to those employed; and when it is remembered that these ditches carry 1500 inches of water, it will readily be seen that the aggregate result will be great. Of the quartz lodes we have spoken so often that a reiteration of an oft-told story would look like supererogation. There is, however, no longer any doubt about the immense extent and value of the Keating, Ohio, and Ironclad lodes, while a new one, discovered by Mr. ALLEN, in the same neighborhood, is developing very rich and extensive These, without anything else, will make the camp one of the most important in the world at no very distant day. The town of Radersburg has undergone this spring a very marked improvement, and must continue to improve on account of its favorable locality. The people are enterprising and liberal. The same is the case with the inhabitants in the vicinity. Stock raising and farming is here carried on with vigor in the beautiful Crow Creek valley, and we know of no more desirable country for an enterprising pilgrim to cast his lot in than Crow Creek, or the Missouri valley between the Horse-shoe Bend and Cañon Ferry. Owing to a superabundance of water, St. Louis, on the upper Indian creek, does not present as favorable an appearance as it did earlier in the spring. The shafts and drain ditches on many claims have been so damaged that they have been abandoned for the present. They will be re-opened in due time, however, and will afford good fall and winter mining. The quartz of this district is probably as rich and extensive as that of Radersburg, but has not been so thoroughly tested. We have seen wonderful results from pannings from some of the lodes. Springville (vulgarly called "Hog-em" by the outside barbarians,) makes a better showing this year than it has for several years past, owing to the fact that they are favored by a fair supply of water. The bars on Coats' gulch and Indian creek are turning out well, as we were informed by several of the proprietors of the hydraulic and ground sluice diggings. These placers are, perhaps, the richest in the Territory, as well as the most extensive, as will be more fully proven when an abundance of water shall be brought upon them, which cannot be deferred much longer. We notice few or no loafers about the camps this season, and greater industry than we have ever observed before in the Territory. The miners are making money while the water lasts, and gold dust will become plentiful in a short time.

Oregon.

We clip the following from the Oregon *Democrat*:

THE ORO FINO.

This is the name of a quartz ledge lately discovered near Shanghai, in the Eagle Creek mining district. It is probably the richest ledge found on the Pacific coast within late years, and promises to bring to its owners an immense fortune, with very little effort on their part. We have been shown several specimens from the lode, and also the results of tests made under very unfavorable circumstances. One of the tests was the result of one ounce and two-fifth of an ounce of rock crushed in a hand mortar, yielding about fifty cents, and the other tests were the washing out of decomposed quartz on the side of the ledge, from which was realised from one dollar to twenty to the pan of dirt. The finding of nuggets an inch in length is not an unusual occurrence, and smaller pieces of gold are thought but little of, as they are generally found in every pan of dirt washed. No practical assays, however, have been made, but rock has been sent to Boise city for that purpose.

Mr. MCDOWELL, just from the Confederate diggings, three miles west of Snake river, reports work in that camp progressing favorably. In the claim in which Mr. MCDOWELL is interested, the miners had gone down some thirty feet without finding the bedrock, and the ground prospected well from the surface. About eight feet more will bring them to the bedrock. Below this claim, at the mouth of the creek, the bedrock has been struck, and as high as one hundred dollars taken out of three feet square of surface. Three shafts, sunk in a straight line, show the channel to be over a hundred feet wide. The owner has been offered $1,000 for a half interest in the ground. The gold is of the coarse order, and pieces weighing from $5 to $17 have been found. Water can be had all the year round in abundance. Mr. MCDOWELL is of the opinion these diggings are very rich.

Utah.

TINTIC DISTRICT.

We take the following from the special correspondence of the Salt Lake *Tribune*:

SILVER CITY, May 18th, 1871.—HOMAN & CLARKSON start their furnace to-morrow, with Eureka, Swansea and Sunbeam ores.

Messrs. CONGAR & LOOMIS, the purchasers of the Sunbeam (WHITNEY'S claim), have taken possession of the mine, and are highly pleased with their bargain, the ore increasing both in quantity and quality.

An assay office is in course of erection here. The O. K. mining company are displaying considerable energy and are opening up some fine leads.

The Pioche Co. have resumed operations on their best mines. A rich vein of chloride has been struck on the Glasgow. The Highlander is turning out rich ore from the Adams discovery claim. The indefatigable N. P. LAKE, with his usual energy, has started a new well; it is now down sixty feet, with prospects for water.

Parties are sinking on the Black Dragon lode, foot for foot, and considering the hardness of the quartz and the cost of sinking, the parties must think considerable of it.

There are a great many ledges and rich ores, too, that parties with means could do well by developing for an interest. The Leviathan lode, situated on the south side of Eureka hill, could be worked that way; there are as good indications there as on the Eureka, but the parties have not the means to develop. The Continental mining company have developed two lodes that way, and are well pleased with the result.

The Shoebridge lode has opened up finely, with a four-foot vein of rich ore. It looks splendidly, and bids fair to become the Emma of Tintic. The Milton lode is being worked day and night, and already their dump shows a fine body of ore. They have struck the Uncle Sam in a new place, and it looks larger and richer than ever.

W. JONES, Esq, formerly superintendent of the Continental Mining Company, is here. He is interested in the Shoebridge.

BINGHAM.

This is the only camp in which placer mining is found. Here, for years, gold has been panned out at a profit, and to-day, with rude contrivances, men are really making good wages, and with proper machinery and good miners, this cañon would yield a large return in placer mining.

Gold also appears to a greater or less extent in the quartz. This district is noted for its true fissure veins, and is said to contain a fair proportion of free milling ore. Perhaps there is no camp near the city that has so large and well-defined ledges. I examined one of Mr. KELSEY'S newly discovered ledges that he has sunk on ten or twelve feet, and found the wall rock of the most beautiful porphyry, smooth as glass. This ledge he calls the Romulus. Whether it maintains the prestige of the old Roman hero remains yet to be tested.

There is not much evidence here of horn silver, and other fancy kinds of ore, but an inexhaustible supply of ores of various kinds that will pay a good profit with judicious handling, and with a fair dealing on the part of those having the transportation of the country under their control.

If, however, it should prove to be the settled policy of the railroads to tax the industry of the mines beyond what the ores of the country will justify, labor must seek a more inviting field, and the freight cars return empty, while Utah, with such solid wealth, will be unable to develop it, and again become a pastoral region; but it cannot be possible that those great corporations will be so short-sighted as to kill the goose that is laying them so fine a *silver egg!*

Among the many enterprises here are the four tunnel companies inaugurated by Mr. KELSEY. The first in importance at present is the Kelsey tunnel, now in two hundred feet; the second, the New York tunnel, is not far in yet, but having a fine beginning; third, the Boston Tunnel Company, not yet in very active operation, but preparing for action. The same is true of the Godbe Tunnel Company.

These enterprises will fully settle the question as to the depth of the various veins running across their course, and prove the truth or falsity of the position taken by many in regard to the richnes of the ores increasing as they go down on the ledge. Passing under or through so many lodes, will prove of great value and wealth to the tunnel owners, if their theory is sustained by development. They certainly show great faith in their opinion by their works.

In the neighborhood of Buell's furnace there are some fine lodes, if the ores are rich enough for successful mining. Buell's mine is one of the largest galena lodes in the country, but as it has not been opened to any great depth, its value cannot be ascertained at present. The Spanish is a peculiar mine, with a tunnel 400 feet in extent, driven without any apparent aim; irregular, very much as if the parties had operated entirely without chart or compass,—a large amount of ore taken out and the mine caved in, damaging it to an enormous extent.

THE WINNEMUCK MINE, situated in Bingham Cañon, is the first instance in Utah in which a final survey has been ordered and approved by the Surveyer General, under the act of Congress of July 26, 1866, to the end that a patent from the United States may issue therefor.

ORE AND BULLION SHIPPED.

According to the *Salt Lake Herald*, the following is the amount of ore and bullion shipped from Salt Lake City, from the opening of the mines up to the present time:

From January 13th to December 31st, 1870, there was shipped east, to Chicago, Boston, Newark and England 2958 tons of ore, and west, to Reno, Truckee and San Francisco 2325 tons. Of bullion during the year 1870 there was shipped east, for England, 4000 lbs., and west, for San Francisco, 13,000 lbs. Total shipment for 1870—ore 5293 tons; bullion 17,000 lbs.

From January 1st to May 25th, 1871, there was shipped east, to Omaha, Chicago and England, 3182 tons of ore, and west, to Reno, Truckee, and San Francisco, 782 tons. Of bullion there was shipped during the same period; east, to Omaha, Chicago and England, 350,554 lbs., and west, to Reno and San Francisco, 166,300 lbs. Total shipment thus far in 1871—ore 3964 tons, bullion 516,854 lbs. Grand total of shipments east and west, from Jan. 13th, 1870, to May 25, 1871; 9257 tons of ore and 533,854 lbs of bullion.

The above is a fair showing of what Utah may become as a mineral producing country, and is really the result of about eleven months mining, for it must be remembered that the shipping of ores per Utah Central did not commence in earnest until July 1st, 1870.

THE MINES GENERALLY.—Of the mines much has been said heretofore, and much can justly be said of them yet. On Lion hill are several good mines; probably the best-developed mine of the camp is the "Mountain Tiger" mine, which is upon this hill. This mine has been tunnelled through rich chloride 129 feet, and a shaft sunk at the end of the tunnel, following a rich vein of ore thirty feet almost perpendicularly, where a vast body of silver-bearing quartz was struck and tunnelled into more than ten feet. Assays of this quartz sometimes show an average of $600 per ton of silver. On the dumps of this mine are upwards of 500 tons of ore, the average assay of which is about $140 per ton. The "Mountain Lion" mine is being worked with great success, yielding ore assaying from $200 to $800 per ton, and in large quantities. The "Sunny Side," "Defiance," "Zella," "Silver Chief," and others are on this hill, and all are looking well. The mines of Silver Hill are in the midst of "horn silver" glory. On the opposite side of the cañon is Base Metal Hill, the mines of which are nearly all paying expenses and some much more. Prominent among these are the "Velocipede," "Silver Shield," "Burnett," "McCullom," "California," and "Hidden Treasure." Farther up the cañon is Chloride hill, upon which are located some good mines. The mines of this hill have not received much attention, the reason for which we are unable to give. The "San Joaquin" mine is the most promising. The "Crown Point," "Chloride Gem," and "Dixie" are good prospects, and being worked to some extent. The great need of the camp has been capital and enterprise; both of which are coming forward, and we trust will be amply rewarded. The robbery system of developing mines for the ore, as in the cases of "Petalumna," upon Mountain Tiger, and "Mormon Belle," upon Mountain Lion, will, it is hoped, be abandoned in the future. Large quantities of milling ore are upon the dumps of the various mines awaiting the completion of the mills, when East Cañon will begin to "pan out," and the value of its mines may then be judged by the quantity and quality of its bullion.

LITTLE COTTONWOOD.

Little Cottonwood District begins to be lively. Twenty and thirty prospectors, miners, business men, and speculators are coming in daily since the 12th of this month. Regarding the mineral prospects of Little Cottonwood cañon, there is but little for me to say. It still demonstrates its superiority over all camps of the Territory. Little Cottonwood can alone, at present, ship ores averaging two hundred dollars per ton in silver, to an extent that the Territory has not yet witnessed. Trains of wagons loaded with the precious ores will soon commence to pour down from our camp, through the valley to Salt Lake City, in such a manner as to demonstrate the character and solidity of the mines. Prospecting is beginning on the southern slopes of the mountains from which the snow rapidly disappears. The Savage, Montezuma, and Flagstaff are all very well developed—in fact most of the mines in that entire range of hills seem to give evidence of great value. I took special pains to examine the Relief, owned by my friend, Mr. VINCENT, of Des Moines and his associates. I was gratified to see so fine a prospect, and hope he has struck the right thing for a fortune. In American Fork there has not been so much development yet. If the Miller and Sunbeam can be taken as samples, it will show marvellous developments in the next few months. As it is a settled fact that the mines of Cottonwood are as permanent as the hills they are in, the next question naturally arises: Can the ores be dug out and got to market at a profit to the miner, with the present horrid road and the cut-throat R. R. tariff? I would have to say it is a little mixed. With a narrow gauge railroad as far up the cañon as feasible, with some kind of tramway down the mountain, and in the hands of men who would have comprehensive and liberal views as to the rights of labor, with cheap transportation, or what would be better, if coke can be obtained at living prices delivered at the mouth of the cañon where water is plenty and sites for furnaces abundant, that would solve the question of ore in base metal. There are some milling ores, and new discoveries every day justify the belief that milling ores can be found in sufficient quantities to justify the erection of mills. A few months will determine those important questions. One species of vandalism practised in that cañon deserves the most severe and speedy remedy; it is the destruction of timber, of which there is not any surplus, for every tree suitable for timbering mines that is put into charcoal, another must be brought from some other region to replace it. The Government ought to step in with its strong arm and save the timber to be used in developing the many mines in that district. If the present destructive policy is pursued, very soon the want of timber will be a serious question.

From the Salt Lake *Tribune*, of the 17th ult., we learn that the first wagon load of good coke ever made in Utah has just been brought to town from Weber, where it was coked by Mr. CARLETON from the telegraph coal-bed owned by him. The advent of good coke, at a low figure, will be hailed as a blessing by all the smelters in the neighborhood of Salt Lake City. The trouble of getting it heretofore is now avoided, the distance to the mine and rate of freight being comparatively unimportant. His coke is pronounced by ZABRISKIE & HOPPER to be of superior quality, but of course it will work its own way as soon as tried.

RICH DISCOVERY.

The Salt Lake *Herald*, of the same date, contains the following: "A gentleman yesterday had some very rich specimens of ore in town, taken from an old mine which was moss-covered when discovered and ancient-looking, yet still bearing chissel-marks, and showing other evidence of having been worked in by-gone ages. He had stumbled into a shaft accidentally, and when in concluded to do some prospecting, which resulted in the specimens brought into town. They are very rich, and though not assayed, competent judges place them at over $6,000 to the ton. The mine is within ten miles of Eureka Hill. TINTIC, though the discoverer, is very reticent as to its exact location. He says the ledge is four feet wide. He also found horn-silver float ore up to the summit of the mountain, where the old shaft is. That the Mexicans formerly worked in this region is beyond a doubt, several of their shafts having been already discovered; and as low-grade ores would have been of no value to them, and they probably were unacquainted with chlorides, bromides, sulphurets, horn-silver, or other formations in which the precious metals are found, they doubtless sought for native silver. At any rate, as far as discoveries have gone, those old shafts still contain rich ore that pays well for working."

THE COAL TRADE.

BENJAMIN R. WESTERN, COAL EDITOR.

Anthracite Coals.

NEW YORK, June 23, 1871.

WHOLESALE.—The coal market has been moderately active during the past week, and dealers feel a little more hopeful. Many buyers are discounting the chances of any advantage being gained by waiting for the next Scranton sale. We see no reason to change our opinion as expressed last week, and really believe that a purchaser can on the average make as favorable purchases prior to the sale as afterwards. Dealers are beginning to feel that the season is fast wearing away. The deficit caused by the strike gives them some uneasiness, and many are fearful lest the tide will turn before they have made their choice of a supply, and in the bustle and excitement of an active market after the sale they may not only pay higher rates for their coal and freights, but will also have to put up with inferior qualities. The large companies in and about the city are rapidly stocking up, and their yards already exhibit huge mountains of coal. Let retailers in this vicinity bear in mind that the movements of their rivals are worthy of notice. We are under the impression that the market will stiffen up considerably before the Scranton sale takes place, and much business will be transacted during the coming week. The operators in the Lehigh region, whose miners have, as we noticed last week, accepted the terms offered, will have coal coming to market by July 1st. Dealers wanting the favorite Lehigh coals had better get their orders booked as soon as possible.

Many buyers in keeping a close watch on the price of coal and a favorable moment to buy, are apt to lose sight of the question of freights. Now, it seems to us that the advance of freights is as much to be taken into consideration as the decline in coal. The advance of thirty cents per ton in freight to eastern ports on the immediate resumption of an active business is certain, while a decline of fifteen cents per ton is only possible. We emphasize these remarks from the fact that we want our readers to buy at the most favorable moment and to be the money-makers in the trade. Outside of this, we have no interest one way or the other.

RETAIL.—Consumers exhibit no uneasiness about a supply, notwithstanding prices having reached a figure that will warrant laying in a stock. Many manufacturers and families will, we feel, find themselves mistaken in thus putting off a favorable time to make contracts. Company coals are selling at from $6 00 to $7 25, while Lehigh and special coals range from $6 75 to $7 75.

FREIGHTS.—There has been a slight advance in freights on the increase of orders and improvement in business. Vessels are, however, plentiful yet. We quote, Boston, $1 50; Providence, $1 40; New Haven, $1 00; Harbor, 50 cents from Elizabethport.

LATER NEWS.

Since the above was in type we have received the contractors' circular of the Pennsylvania Coal Company, giving their prices for July, as follows: Lump, $4 50; Steamer, $4 50 Broken, $4 70; Grate, $4 70; Egg, $4 80; Stove, $5 00; Chestnut, $4 90.

This circular struck terror and dismay through the whole trade, and is considered a heavy "bear" movement to reduce prices and cause a heavy decline at the coming Scranton sale. We doubt, however, if it will have this effect. Dealers must bear in mind that *contractors only* get their coal at these prices, and, in our opinion, they are lucky who happen to be contractors. Not one pound of this coal can be bought by an outsider at anywhere near these rates. So, in fact, this circular should have little or no effect on the market. The Scranton Company advertise elsewhere their 91st sale, at which they propose to sell 120,000 tons of coal, about 10,000 tons more than was actually disposed of at the last sale. In our opinion, those that buy this coal will be equally lucky with the contractors of the Pennsylvania Company, and will secure a portion of their supply at the lowest figures of the season. Let no one be led away with the idea that everybody can be supplied out of this 120,000 tons, for this is an impossibility; but that much strife will manifest itself, and a few favored ones will be the happy parties, is all the consolation there is to be had. We are satisfied that there is a preconcerted plan among the large companies that will show itself in a few weeks, and, as usual, the retailer and consumer will come off second best, if they are not careful. The circular of the Pennsylvania Company, issued at the reduction of $1 00 on all sizes from last month's prices, looks as though they were combined with the Scranton Company, who offer an unusually large quantity of coal at the coming sale. Their object is to keep trade dull as late in the season as possible, and buyers quiet, then in the fall, when only two months remain in which coal can be shipped by water, take advantage of the position and run up the price. We are some 3,000,000 tons behind-hand this year, in consequence of the long strike just ended, and these low prices are unwarranted and cannot be maintained.

Anthracite Coal Trade for 1870 and 1871.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending June 17, 1871, compared with week ending June 18, 1870.

COMPANIES.	1870. WEEK.	1870. TOTAL.	1871. WEEK.	1871. TOTAL.
*Phila & Reading R.R.	30,725	1,059,398	113,717	1,225,300
Schuylkill Canal	3,065	74,448	33,743	252,424
Lehigh Valley R. R.	48,850	1,489,142	27,228	690,194
Lehigh & Sus. R. R.	20,387	440,323	28,885	371,916
Lehigh Canal	23,168	149,671	16,245	68,215
Scranton North.	15,190	302,388	14,224	64,210
" South	35,478	824,428	47,124	149,919
Penn. Coal Co., rail	24,631	503,620	26,928	94,903
" " canal	719	6,092	118	1,067
Del. & Hud. Canal Co.	51,416	546,025	41,111	142,469
" " East	4,503	193,314	8,908	79,566
" " West	1,316	37,239	3251	20,799
South	10,099	192,657	13,155	63,714
Shamokin	8,089	146,089	13,891	281,465
Trevorton	2,441	38,939	....	....
Lykens Valley Coal Co.	3,709	35,652	....	33,956
Wyoming South	....	77,140	....	....
Wyoming North	....	....	....	....
P. N. Y. U. & R. R. Co.	2,894	135,903	8,736	57,494
Williamstown Co'y.	7,153	126,115	....	....
Big Lick Col.	....	18,409	....	50,574
Total	293 833	6,397.012	397 264	3,558,485
1870	....	3,558,485	293,833	
Decrease	....	2,838,527		
Increase			103,431	

* Less coal transported for Co's use and Bituminous coal

Bituminous Coal Trade, 1870 and 1871.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending June 17, 1871, compared with week ending June 18, 1870.

COMPANIES.	1870. Week.	1870. Year.	1871. Week.	1871. Year.
B. & O. R. R.	18,507	194,860	30,003	550,331
C. & O. Canal	17,605	571 804	15 616	267,020
H. & B. T. R. R.	6 642	140 918	6,171	171,167
Harrisburg & D.	15,692	359,920	19,873	378,472
L. V. R. R.	....	6,622	....	37,723
P. & N.Y.C & R. Co.	5 829	107 330	7,510	140,572
Cumberl'd Branch	2.427	44,219	1,518	34,818
" Canal.	3.988	39.248	2,608	77,228
Total	70,690	1,264,921	83,299	1657,433
			70,690	1264,921
Increase.			12,609	392,512

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for week ending June 17, 1871, previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt
Total Wyoming	21,607 02	167,723 14
" Hazleton	10 00	222,738 00
" Upper Lehigh		442 06
" Beaver Meadow		75,443 03
" Mahanoy	13,764 15	233 457 14
" Mauch Chunk	991 01	4,584 15
" Sullivan & Erie		26 05
Total Anthracite	36,372 18	704,015 17
Bituminous Coal from all sources		37,725 00
Total by rail and canal	36,372 18	741,740 17
Same time last year	67,820 06	1,779,829 07
Increase	31,447 08	1,038,088 10
Decrease		
Forwarded East from Mauch Chunk by rail	27,228 01	600,194 14
Same time last year	48,849 15	1,489,141 19
Increase		
Decrease	21,621 14	888,947 05

RECAPITULATION.

Forwarded East from Mauch Chunk by rail	27,228 01	600,194 14
To N. C. R. R., at Mount Carmel	"	2,967 13
Forwarded North from L. & B. Junction	7,271 11	57,668 00
To L. & S. R. R. at Packerton for rail	11 01	2,946 06
Delivered at M'h Chunk	5 00	441 16
Delivered on line of road above Mauch Chunk	295 04	4,753 00
Delivered above Mauch Chunk for use of L. V. R.R.	1,251 15	23,046 14
To L. & S. R. R., at Penn Har., for railroad		94 10
Do. for canal		7,128 08
At M. Chunk for canal	310 06	4,774 15
Total Anthracite	36,372 18	704,015 17
Bituminous Coal		37,725 00
Total all kinds	36,372 18	741.740 17

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Sus. Div.)

Week ending June 17—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1871., tons ct	WEEK 1870. tons ct.	YEAR 1871 tons cwt.	YEAR 1870. tons cwt.
Wyoming Region	34713 01	28487 13	392488 15	512811 14
Upper Lehigh Region		4288 05	4614 06	57453 11
Beaver Meadow Region		4550 13		36874 02
Hazleton Region	11 01	10821 16	1813 02	76980 12
Mahanoy Region		97 00		292 04
Treskow Region			1565 11	
Mauch Chunk Region	6063 04		48792 02	30089 18
Totals	40787 06	48345 07	449273 16	713502 01
Increase	7558 01		264228 05	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	28884 12	30386 16	371916 08	440322 16
Forwarded East of Mch Chunk by Canal	5485 01	22107 15	28317 02	153101 18
Delivered at and above Mauch Chunk	1290 01	849 10	25167 06	18538 05
Delivered to L. & B. R. R. at Plymouth Bridge	2735 09	4305 03	8478 11	89138 14
L. V. R. R. at Packer'n	2332 12	496 03	15384 07	12400 08
Totals	40787 06	48345 07	449273 16	713502 01
Of the above there was transported on acc'nt of L. C. & N. Co.	8979 15		59747 05	46743 15
W.-B. C. & I. Co.	22406 01	1435501	312633 00	219795 11
Totals	31385 16	14355 01	372380 05	266539 06
Increase	17030 15		105840 19	
Decrease				

Lehigh Canal Coal Trade.

Shipped for the week ending June 16, 1871.

	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total from Mauch Chunk Region,	9257 14	41713 10
" " Beaver Meadow "		778 12
" " Mahanoy "	310 06	1341 07
" " Hazleton "		1246 00
" " Upper Lehigh "		
" " Wyoming "	6676 15	23185 15
Total	16244 15	68215 04
Corresponding week last year	23167 11	149670 11
Increase		
Decrease	6922 16	81455 07

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, June 17, 1871.

BY RAILROAD—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons. Cwt.
From St. Clair	41.209 18
" Port Carbon	6,696 04
" Pottsville	2,134 18
" Schuylkill Haven	36,317 10
" Pine Grove	5,754 05
" Tamaqua	19,740 05
" Harrisburg	
" Dauphin	7,057 09
Total	119,110 09

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	11,470 11
" Mill Creek "	1,763 00
" Schuylkill Valley Scales	1,556 11
" Mt. Carbon "	2,304 15
" Cressona "	14,467 13
" Pine Grove "	
" Tamaqua "	2,038 15
Total	33,401 05

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	2,256 03
" Shamokin	2,585 19
" Herndon	
Total	4,841 13

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	824 00
" Lebanon & Pine Grove Branch	767 01
Total	1,591 01

CONSUMED ON LATERALS.

From Frackville Scales	684 11
" Mill Creek "	501 06
" Schuylkill Valley Scales	678 00
" Mt. Carbon "	733 01
" Cressona "	148 09
" Pine Grove "	20 10
" Tamaqua "	73 04
Total	2,739 01

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	22 02
" " Alburtis, " "	29 13
" " Oreland, G. & N. Br.	85 15
" " Connecting R. R	
" " Willow Street R. R.	55 13
Total	193 03

BITUMINOUS.

From Harrisburg	12.815 19
" Connecting R. R., G. & N. Br.	
" Junction R. R.	165 15
Total	12,981 14

COAL FOR COMPANY'S USE.

Anthracite	4 026 14
Bituminous	303 13
Total	4,330 10

RECAPITULATION

	Total for Week.	Corresponding week last Year.	
Passing over Main Line and Leh. Val Branch	119,110 09	33,994 16	i 85,115 13
For Shipment by Canal	33,401 05	2,955 10	i 30,445 15
Shipped Westward via Northern Central R. R.	4,841 13	3,542 17	i 1,298 16
Shipped West or South from Pine Grove	1,591 01	190 06	i 1,400 15
Consumed on Laterals	2,739 01	2,089 15	i 649 06
Lehigh and Wyoming Coal	193 03	1,415 02	d 1,221 19
Total Anthracite paying fr'gt	161,876 12	44,188 06	i 117688 06
Bituminous	12,981 14	8,836 16	i 4,144 18
Total of all kinds paying fr'gt	174,858 06	53,025 02	i 121833 04
Coal for Company's use	4,330 10	1,799 19	i 2,530 11
Total Tonnage for Week	179,188 16	54,825 01	i 124363 15
Since Dec. 1, 1870	1942298 00	1596073 00	i 346225 00
Total to date	2121486 16	1650898 01	i 470588 15

SHIPPED BY CANAL.

	Total for Week.	Corresponding week last Year.	
From Schuylkill Haven	31.605 13	2,956 10	i 28649 03
" Port Clinton	2,139 00	570 00	i 1,569 00
Total Tonnage per Week	33.744 13	3.526 10	i 30218 03
Since Dec. 1, 1870	218 681 07	71,533 05	i 147148 02
Total to date	252,426 00	75,059 15	i 177366 05

Philadelphia and Reading R. R.

Amount of coal transported on the Philadelphia and Reading Railroad during the week ending Saturday, June 17, 1871:

	tons. cwt.
From St. Clair	41,3 9 18
" Port Carbon	6,696 04
" Pottsville	2,134 18
" Schuylkill Haven	36,317 10
" Auburn	7,466 18
" Port Clinton	19,740 05
" Allentown and Alburtis	51 15
" Harrisburgh and Dauphin	19,8:3 08
Total paying freight	133,690 16
Coal for Company's use	4,330 10
Total for week	137,921 06
Previously this year	1,466,733 11
Total	1,604,654 17
To same time last year	1,421,388 12

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, June 17, 1871.

	Tons. Cwt.
From Port Carbon	
" Pottsville	
" Schuylkill Haven	31,605 13
" Port Clinton	2,139 00
Total for week	33,742 13
Previously this year	218,681 07
Total	252,424 00
To same time last year	74,447 15

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, June 17, 1871.

	WEEK.	SEASON.
North	55,005 12	183,204 14
South	13,155 09	63,714 09
Total	68,161 01	246,919 03
Corresponding time in 1870:		
North	44 374 03	1,053,522 10
South	10,093 12	192,657 07
Total	54 467 15	1,246,179 17
Increase North	10,631 09	870,317 16
Increase South	3,056 17	128,942 18
Total increase	13,688 06	999,260 14

The following is a statement of Coal transported by the Delaware and Hudson Canal Co., for the week ending June 17, 1871.

	WEEK.	SEASON.
By Del. and Hud. Canal,	41,111 00	142,469 00
By Railroad East,	8,908 00	79,566 00
" West,	3,251 00	20,799 00
South	13,155 00	63,714 09
TOTAL TONS.	66,425 00	306,548 00
For the same period last year.		
By Del. and Hud. Canal,	51,416 00	546,025 00
By Railroad East,	4,503 00	193,314 00
" West,	1,316 00	37,239 00
" South,	10,099 00	192,657 00
TOTAL TONS,	67,334 00	969,235 00

Delaware, Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna and Western R. R. for week ending June 17, 1871.

	Week. Tons. Cwt.	Year. Tons. Cwt.
Shipped North	14.224 6	64,210 7
Shipped South	47,123 11	149,919 8
Total	61,347 17	214,129 15
For the corresponding time last year:		
Shipped North	15,189 11	302,388 6
Shipped South	35,477 15	824,427 16
Total	50.677 6	1,126,816 2
Increase	10,680 11	
Decrease		912,686 7

Pennsylvania Coal Company,

Shipments of Pittston Coal for the week ending June 17, 1871.

	1871. WEEK.	1871. YEAR.	1870. WEEK.	1870. YEAR.
By Railway	26,928 6	94,902 13	24,631 10	503,620 3
" Canal	118 11	1,066 12	719 17	6,092 4
Total	27,046 17	95,969 5	25,351 7	509,712 7
Decrease 1871, 413,743 2 tons.				

Shamokin Coal Trade.

For week ending June 17, 1871	13,890 13
Same time last year	8,087 08
Increase	5,803 05
Decrease	
Total amount shipped to date	281,465 01
Same time last year	146,089 07
Increase	135,375 14
Decrease	

Huntington and Broad Top R. R. Co.

For week ending June 17, 1871	6,171 tons.
Same time last year	6,642 "
Increase	"
Decrease	471
Total amount shipped to date	171,267 "
Same time last year	140,918 "
Increase	30,349 "
Decrease	

Report of Coal forwarded by Pa. & N. Y. R. R. Co., for week ending June 17, 1871.

	BITUMINOUS Tons. Cwt.	ANTHRACITE. Tons. Cwt.
By Rail	7,510 07	8,736 04
Previously this year	133,061 05	48,758 02
Total by Rail		
By Canal		
Previously this year		
Total by Canal		
Total for the year	140,571 12	57,494 06
To the same time last year	107,330 00	135,603 04
Increase	33,241 12	
Decrease		77,108 18

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday June 17, and during the year 1871, compared with the corresponding period of 1870.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B. & O. R. R. Co Tons. Cwt.	Total. Tons. Cwt.
1871	15,616 07	30,002 12	45,618 19
1870	17,604 19	18,506 17	36,111 16
Increase.		11,495 15	9,507 03
Decrease	1,988 12		

YEAR.

1871	267,019 11	550,330 16	817,350 07
1870	194,859 10	371,803 18	566,663 08
Increase.	72,160 01	178,526 18	250,686 19
Decrease			

Cumberland Branch.

WEEK.

1871	2.607 11	1.518 11	4,126 02
1870	3,988 09	2,427 04	6,415 13
Increase.			
Decrease	1,380 18	908 13	2,289 11

YEAR.

1871	77,228 04	34,818 06	112,046 10
1870	39,247 13	44,219 06	83,466 19
Increase.	37,980 11		28,579 11
Decrease		9,401 00	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK. June 24. R. A.	W. A.	AT PHILADELPHIA. June 24. R. A.	W. A.
Lump	$—	$—	—	—
Steamer	5 00	—	—	—
Broken	5 50	—	—	— to —
Egg	5 75	— to —	—	— to —
Stove	6 50	—	—	— to —
Chestnut	5 00	—	—	— to —
Pea	—	—	—	—
LEHIGH.				
Lump, (along side)	—	—	—	—
Broken	—	—	—	—
Egg	—	—	—	—
Stove	—	—	—	—
Chestnut	—	—	—	—
Pea	—	—	—	—
SPECIAL COALS.*				
Diamond Vein	R. A. 5 50@7 00		—	—
New England	"		—	—
Locust Mountain	W. A. 6 50		—	—
Honey Brook, Leh W.A.			—	—
Spring Mountain	"		—	—
Sugar Creek	"		—	—
Sugar Loaf	"		—	—
Old Comp'y's.	"		—	—
Cross Creek	"		—	—
Room Run	"		—	—
Girardville	"		—	—
McMichael	"		—	—
Shamokin	"	5 25	—	—
Lykens Valley	"	5 75	—	—
Broad Top	"	5 25	—	—
Hill & Harris	"	5 25	—	—
Henry Clay	"	—	—	—
Powelton	"	5 25	—	—

[*Dealers in these coals may be found in our advertising columns.]

Company Coals.

June, 1871.

	Lg.	Str.	Gra.	Egg.	Sto.	Ches.
Scranton at E. Port	5 00	5 25	5 50	5 75	6 00	5 25
*Pittston at Newburgh	4 50	4 50	4 70	4 80	5 00	4 30
*Lackawana at Rond't	5 20	5 20	5 50	4 75	6 00	5 20
Wilk'b're at Hoboken	5 00	5 00	5 40	4 75	6 00	5 25
Old Co. Lehigh at Pt. Johnston	6 75	6 00	6 00	6 00	6 50	5 50
Lehigh at E. Port	—	—	—	—	—	—

For freights to different points see "Freights."

* To contractors.

Line Prices for Coal June, 1871,

	Lump	Broken	Egg	Stove	Ches't
At Mauch Chunk	4.50	4.00	4 00	4.25	3.50
" Wilkesbarre,	—	3.75	3.75	4.00	3.25

Prices at Baltimore—June, 1871.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$5 25@5 50
Pittston and Plymouth, do	5 25@5 40
Shamokin Red or White Ash, do	5 25@5 40
Lykens Valley Red Ash, do	— —@5 80
Zerba Valley	— —@— —
Treverton	— —@— —
By retail, all kinds per ton of 2240 lbs.	7 00@7 50
Georges Creek & Cumberland f. o. b. at Locust Point for cargoes	— —@4 75
Fairmount and Clarksburg f. o. b. at L. Point	6 00@6 50
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein f.o.b. at Phila.	$ —
Lemon " " " "	—
Cumberland Vein Coal	—
Consolidation Coal Co.'s on board N. Y.	6 75
Maryland Coal Co. " "	6 75

Prices at Georget'n, D.C., & Alexandria, Va.

June, 1871.

George's Creek and Cumberland f. o. b. for shipping $4 50 @4 60.

Prices at Havre de Grace, Md.

Wilkesbarre and other White Ash for cargoes	$5 50@5 75
Lykens Valley	6 00@6 25
Shamokin Red or White Ash	5 50@6 00
Treverton and Zerba Valley	— —@— —

Prices of Gas Coals.

June, 1871.

PROVINCIAL.

Corrected weekly by Louis J. Beltoni, Jr., 41-43 Pine st., N. Y

	Duty, $1 25, gold Coarse	Slack.
Block House	$1 75 @1 75	
Gowrie	1 75 @1 75	

Corrected by Bird, Perkins & Job, 26 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	@1 25
Sydney	2 25	@- 80
Lingan	1 60	@- 80
Little Glace Bay	1 60	@1 00
Caledonia	1 60	@- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty $1 25 per ton, gold, on the coarse coal. 25 per cent. ad valorem on the Culm of Coal.

AMERICAN.

	Currency.
Westmoreland	7 10 @7 25
Fairmount Gas Coal Co. of N. Y.	7 50 @- —
Despard Coal Co.	$7 50 @- —
Penn	7 75 @8 00
Newburg Orrel Gas	— — @- —
West Fairmount Gas Coal	8 00 @- —

AT PHILADELPHIA.

Powelton	$7 75

Prices of Foreign Coals.

June, 1871.
Duty $1 25 per ton.
Corrected weekly by PARMELEE BROS., No 32 Pine street New York.

Liverpool Gas Coking	$ 9 00@— —
" " Cannel	11 50@12 50
" House	— —@16 00
" Orrel	12 00@14 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@17 50
" Cannel, "	18 00@20 00

Per ton 2,000 lbs. delivered.

Freights.—June, 1871.

TO EASTERN PORTS.	Cumberland. From Georgetown	Cumberland. From Baltimore.	Anthracite. From Philadelphia.	Anthracite. From East Port, Port Johnston, and Hoboken.	Anthracite. From Newbury	Anthracite. From Rondout
Amesbury			$2 50	$1 75		
Bangor	$2 75		2 30	1 50		
Bath	2 75	2 75	2 30	1 75		
Boston	2 50	2 50	2 25	1 50	180	1 80
Bridgeport	2 25	2 25	1 80	1 00	1 10	1 25
Bristol		2 60	2 00	1 25		1 55
Cambridgeport			2 75	1 75		
Derby			2 00	1 20		
Dighton	2 30	2 35	2 30	— —		
East Cambridge			2 35	1 75		
Fall River	2 25	2 25	2 25	1 25	1 40	
Hackensack			1 75	1 00		
Hartford	2 50		2 30	1 60		
Jersey City		2 00	1 40	50	70	
Middletown			2 25	1 30		
Mystic			— —	1 30		
New Bedford	2 30	2 35	2 00	1 25		
Newburyport	2 75		2 40	1 60		1 35
New Haven	2 25	2 25	1 90	1 00	1 10	1 20
New London	2 25	2 25	1 76	1 10		1 25
Newport			2 00	1 30		1 40
New York	2 00	2 00	1 80	50	70	65
Norwalk			1 80	1 00	1 10	
Norwich	2 50	2 25	2 00	1 20	1 40	
Pawtucket	2 50	2 40	2 30	1 40		1 50
Portland	2 50	2 60	2 30	1 50		1 65
Portsmouth, N. H	2 75	2 75	1 45	1 60		2 00
Providence	2 25	2 25	2 00	1 40	1 50	1 50
Rockport			2 10	1 65		
Saco	2 75		2 25	1 75		
Sag Harbor			1 70	1 20		
Salem	2 60	2 75	2 35	1 50		
Stamford			2 00	1 00	1 10	
Stonington			2 00	1 25	1 20	
Taunton			2 30	1 60		1 40
Warren			— —	1 30		
Washington			1 25			
TO RIVER PORTS.						
Albany		80				55
Catskill		70				50
Cocksackie		70				50
Coeyman's		70				65
Cold Spring	2 20	70				30
Fishkill		70	1 60			30
Haverstraw						60
Hudson	2 20	2 25				40
New York						60
Nyack			1 75			30
Poughkeepsie						30
Rhinebeck						
Rondout						75
Saugerties			1 60			40
Sing Sing						75
Stuyvesant						75
Tarrytown						75
Troy						55
West Point			1 75			
Yonkers						60

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption	$1 95
For reshipment	1 85

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 84
C. R. R., N. J., Phillipsburgh to Elizabethport	1 25
Shipping expenses at Elizabethport	25
Warfage	10
Total	$2 44

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R. R. from M. C. to Phillipsb'g	$0 84
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	1 25
Shipping expenses	25
Warfage	10
Total	$2 44

TO HOBOKEN.

L. V. R. R., Mauch Chunk to Phillipsburgh	$ 84
Morris & Essex R. R. Phillipsburgh to Hoboken	1 45
Shipping expenses	25
Warfage	10
Total	$2 64

TO SOUTH AMBOY.

L. V. R. R.	84
B. & D. R. R. / Cam. & Am. R. R.	1 15
Shipping Expenses	25
Total	$2 24

PENN HAVEN TO ELIZABETHPORT.

L. V. R. R. Penn Haven to Phillipsburgh	99
C. RR. of N. J. Phillipsburgh to Elizabethport	125
Shipping expenses	25
Wharfage	10
Total	$ 2 59

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 25
" Port Carbon	
" Port Clinton	1 17

TO NEW YORK.

From Schuylkill Haven	$1 90

The Rates of Toll on Lump and Steamer Coal will be ten per cent. less than the above rates. The charge will be per ton of 2240 lbs. No charge less than Forty Cents per ton will be made for any distance. A drawback of thirty cents is allowed on all coal passing Fairmount Locks used at Philadelphia and vicinity.

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$ 80
Freight and towage	1 02
Total	$1 82

TO NEW YORK.

Lehigh Canal	$ 50
Morris Canal / Freight / Towing	2 29
Total	$2 79

TO JERSEY CITY.

Lehigh Canal	$ 50
Morris Canal / Freight	2 09
For re-shipment	2 59
Total	$2 84

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 50
Delaware Division Canal	30
Delaware and Raritan Canal	46
Freight	1 05
Towage	20
Total	$2 51

TO NEW BRUNSWICK.

Lehigh Canal	$ 50
Delaware Division Canal	30
Delaware and Raritan Canal	46
Freight	1 05
Total	$2 31

Foreign and Provincial Freights.

June, 1871.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons	£14 00@£16 00
Liverpool, 5 per cent primage	13s @15 ton.

TO NEW YORK.

Provincial.

Sidney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

TO BOSTON.

Sydney	$ —
Lingan	—
Cow Bay	—
Port Caledonia	—
Little Glace Bay	—

MARKET REVIEW.

IRON.—There continues an active demand for Scotch Pig, and as the recent transactions have reduced the stock somewhat, prices have slightly appreciated—sales have been made of 300 tons Gartsherrie at $32, 1500 do. Glengarnock, and 500 do. Eglinton, on private terms. American remains inactive, but with a light stock full rates are maintained—we quote No. 1 $34@$36, and No. 2 $32@$34. There continues a good demand for new English Rails and prices are very firm—2000 tons 56 lb sold at $56@$57 gold: and 300 do. Old T and Double-headed, on private terms—American are inactive, but unchanged in value. There is no new feature in Refined Bar, the market being very quet and nominally unchanged, though there is a disposition to put up prices, on account of the small margin for profit on importations. Russia Sheet continues to be held with much firmness—400 packs assorted numbers sold at 12 cents gold—Nos. 13 and 14 are held at 13 cents gold.

COPPER.—The manufactures of Copper and Yellow Metal are steady at our quoted rates. Ingot is in steady moderate demand, and the market has a firm and healthy tone; sales have been made of 250,000 lb Lake for immediate and short forward delivery, at 21¼@21½ cents.

LEAD.—The demand for Pig is very sluggish, and prices are without improvement; we have only to notice the sale of 50 tons Spanish at $6 12 gold. Bar 8¼ cents, Sheet and Pipe 10¼, and Tin-lined Pipe 15, *all less* 10 per cent. to the Trade.

SPELTER—Is less active, but is held with much firmness; small parcels from Dealers' hands can be bought rather lower than large lots from importers and speculative hands. The sales are 20 tons Silesian at 6½ cents; and 10 do. of a fancy brand; 6¼, gold. 20 tons selected Missouri Zinc Co. sold at 9 cents currency.

STEEL.—Business is light, and the market is steady—supply good.

TIN.—The causes noted in our last continue to favorably affect the market for Pig, and though the business is not large, prices are very firm and are again a little higher; the sales are 500 slabs Straits, in lots, at 33¼@33⅜ cents; and 15 tons English, 33@33¼ gold. Banca nominally 37¾ cents—we have nothing later from Europe by telegraph. Plates are steady and firm, with a fair demand. Charcoal Terne of all grades are still very scarce; sales have been made of 700 bxs. Charcoal Tin at $8 87½; 500 do. good brands, $8 50 for I. C.; 700 do. Charcoal Terne, $8@8 37½; 100 bxs. do. S. T. P., $8 50; 100 do. Coke Terne, $6 12½ all gold; and 1000 do. Charcoal Terne, on private terms.

ZINC.—Sheet continues in small stock, and very firm at our quotations—50 casks Mosselmann sold from agents' hands, to arrive, at 7¾ cent less 4% cent. gold, and small lots No. 8 and 10x36, from Dealers hands 8¼ gold. Manganese black oxide, 4½ currency; Manganese pyrolusite, highest grade 5½ currency.

METALS.

NEW YORK, June 21, 1871.

IRON.—Duty: Bars, 1 to 1½ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¾ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3cents ℔ lb; Galvanized 2½; Scrap Cast, $6; Wrought, $8 per ton.

	Store Prices, Cash.
Pig, Scotch No. 1, ℔ ton	30 00@34 00
Pig, American, No. 1	34 00@36 00
Pig, American, No. 2	32 00@34 00
Pig, American, Forge	31 00@32 00
Bar Refined, English and American	74 00@75 00
Bar Swedes, assorted sizes (gold)	85 00@100 00
	Store Prices, Cash.
Bar, Swedes, ord'y sizes	105 00@115 00
Bar, Refined, ord'y sizes	75 00@ 77 50
Bar, Refined, ¾ @ 5-16 inch	82 50@ 85 —
Bar, Common	72 50@ 75 00
Scroll	95 00@125 00
Ovals and half-round	95 00@120 00
Band	80 00@ 85 —
Horse Shoe	85 00@100 00
Rods, ⅜ to 3-16 inch	85 50@120 —
Hoop	100 00@140 00
Nail rod	— —@6¾ —
Sheet, Russia, as to assortment (gold)	12 @12¼
Sheet, Single, D. and T. Common	—4½@— 5¾
Sheet, Galv'd. Nos. 14 to 25	12@14 and 30 ℔ ct. dis.
" " Nos. 27, 28, and 29	15@18 and 30 ℔ ct. dis.
Rails, English (gold), ℔ ton	55 00 @57 00
Rails, American, at Works in Pa	70 00 @72 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb. and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 15 @— 18
English Spring (2d and 1st quality)	— 7 @— 10
English Blister (2d and 1st quality)	— 10 @— 17
English Machinery	— 11½@— 14
English German (2d and 1st quality)	— 12 @— 14
American Blister "Black Diamond"	— — @— 12
American, Cast, Tool do.	— 15 @— 16
American, Spring, do.	— 9 @— 11
American Machinery, do.	— 10 @— 11
American German, do.	— 9 @— 11

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 30
Copper Bolts	— @— 32
Copper Braziers, 16oz. and over	— @— 32
Copper Nails	38 @— 38
Copper, Old Sheathing, &c. mixed lots	— @— 19
Copper, old, for chemical purposes, 14@16 oz.	20 @— 21
Copper, American Ingot	21½@— 21⅝
Yellow Metal, New Sheathing & Bronze	— @— 22
Yellow Metal Bolts	24 @— —
Yellow Metal Nails	— @— 22

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb: Pipe and Sheet, 2½ cents ℔ lb.

Galena, ℔ 100 lbs	$— @— —
Spanish (gold)	6 12½@6 15
German, do.	6 12½@6 15
English, do.	6 15 @6 50
Bar (net)	— —@8 75
Pipe (net)	— —@10 25
Sheet	— —@10 25
Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ℔ lb.	

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign	(gold)	p. 100 lb, 5 87½@	6 25
Plates, Domestic		p. lb, — 7 @—	11

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	— @38
Straits	33¼@33½
English	33 @32½

PLATES.	Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$8 50 @8 75		$9 75 @10 25
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Coke Terne	6 12½@7 25		7 00 @ 8 25
Charcoal Terne	7 75 @8 50		9 00 @ 9 75

ZINC—Duty: Pig or Block, $1 50 ℔ 100 lb.; Sheet, 2½cts. ℔ lb.

Sheet, No. 9 to 11 Foreign ℔ lb.	— 8¾@—9¼

Mining Stocks.

NEW YORK, June 22, 1871.

The market in Gold Stocks is firmer. All on the list have advanced compared with our last report. We hear of no sales. Below is the full report of the Mining Stock Board.

GOLD STOCKS.

	BID.	ASKED.
American Flag	15	25
Bates & Baxter	30	—
Benton	—	7
Black Hawk	30	40
Central Gold	9	10
Cons Gregory	47	51
Grass Valley	10	14
Gunnell	—	—
Holman	17	—
La Crosse	16	19
Liberty	—	—
Mariposa prf	—	—
Montana	—	—
Rocky Mount	—	—
Quartz Hill	25	35
Smith & Parmlee	30	45
N. Y. & Eldorado	—	—

DEPARTMENT OF PUBLIC WORKS, No. 237 Broadway.

TO CONTRACTORS.—Proposals inclosed in a sealed envelope, with the title of the work and the name of the bidder indorsed thereon (ALSO THE NUMBER OF THE WORK AS IN THE ADVERTISEMENT), will be received at this office until Monday, July 3, 1871, at 11 o'clock A. M., for the following work.

1—For paving Broome st., between Broadway and Centre-st., with Belgium pavement, and laying cross-walks at the intersecting streets where required.

2—For paving Bayard-st., between Bowery and Baxter-st., with Belgian pavement, and laying cross-walks at the intersecting streets where required.

3—For paving Willett-st., from Grand to Rivington-st., with Belgian pavement, and laying cross-walks at the intersecting streets where required.

4—For paving Thirty-second-st., from Second-ave. to East River, with Belgian pavement, and laying cross-walks at the intersecting streets where required.

5—For paving Forty-fifth-st., from Second-ave. to East River, with Belgian pavement, and laying cross-walks at the intersecting streets where required.

6—For paving Fifty-first-st., from Broadway to Eighth-ave., with Belgian pavement, and laying cross-walks at the intersecting streets where required.

7—For paving Fifty-seventh-st., from Eighth to Ninth ave., with Belgian pavement, and laying cross-walks at the intersecting streets where required.

8—For paving Astor-place, from Fourth-ave., to Broadway, with Belgian pavement, and laying cross-walks at the intersecting streets where required.

9—For paving Eighth-st., from Fourth-ave., to Broadway, with Belgian pavement, and laying cross-walks at the intersecting streets where required.

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11—For sewer in One-hundred and Fifteenth-st., from Avenue A to First-ave.

12—For sewer in One Hundred and Twenty-third-st., from Avenue A to Second-ave.

13—For outlet sewer in One Hundred and Eighth-st., from Hudson River to Boulevard; to One Hundred and Tenth-st., to Tenth-ave., with branches in Boulevard and One Hundred and Sixth and One Hundred and Seventh sts.

14—For sewer in Sixty-fifth-st., from First to Third-ave.

15—For underground drains between Seventy-third and Eighty-first sts., and First and Fifth-aves.

16—For regulating, grading, curb, gutter and flagging Lexington-ave., from Sixty-sixth to Ninety-sixth-st.

17—For curb, gutter and flagging First-ave., from Twenty-third to Thirty-fourth-st.

18—For flagging One Hundred and Twenty-third-st., from Third to Fourth-ave.

19—For flagging Fifty-ninth-st., from Ninth to Tenth ave.

20—For flagging Fifty-fifth-st., from Broadway to Eighth-ave.

21—For flagging Greenwich-st., from Laight to Canal street.

22—For furnishing this department with granite basin heads and their appurtenances.

Blank forms of proposals, the specifications, and agreements, the proper envelopes in which to enclose the bids, and any further information desired, can be obtained on application to the Contract Clerk at this Office.

WILLIAM M. TWEED,
Commissioner of Public Works.

NEW YORK, June 21, 1871. 2:t:

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.

On the petition of JOHN TOULMIN of Worcester, Mass., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Vibrating Shears.

It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

A New Method of Tapping Blast-Furnaces Used for Lead Smelting.

By A. EILERS, M. E.

AT the smelting works of the Eureka Consolidated Company, in Lander county, Nevada, the Piltz furnace has been in use for nearly a year, and the results obtained by that excellent furnace have been highly satisfactory. A very important improvement has been lately added to this furnace by Messrs. KEYES and ARENTS, the superintendent and the metallurgist of the company, which increases considerably the already astonishing results obtained with this shaft-furnace. At the same time this improvement can be added, with only slight modifications, to all kinds of shaft-furnaces used for lead and copper-matte smelting; and its introduction is therefore of great importance to metallurgists. I speak of the automatic tapping apparatus now in use at the above-named works, which consists simply in a pipe, introduced in the side of the furnace at the bottom of the crucible, from which it slants upwards ending in a kettle, the upper rim of which is at a level with the height of the lead-bath in the furnace, when the crucible is filled. It is claimed and proved by the actual working of this method of tapping, that—

1. The furnace runs more regularly.
2. The lead obtained is purer.
3. "Sows" are prevented.
4. The work of the smelters is lightened.

These results agree entirely with the theories bearing on the subject, as I shall show hereafter, but a fifth beneficial result might be added, namely, saving of fuel.

When the usual method of tapping a lead-furnace is followed, the blast is stopped and the tap-hole in the bottom of the crucible is opened (sometimes with great difficulty, when metal has cooled in it at a former tapping). The lead, matte and slag run out into the kettle, the hole is stopped again with clay or a mixture of clay and coal dust, called "stübbe," and the blast is turned on, and smelting resumed. With the cleaning of the crucible, building up of fore-hearth, etc., this part of the smelting often takes considerable time, and the temperature in the furnace is reduced, so that much fuel is burned to make up the lost heat. Irregularities in the running of the furnace are frequently directly traceable to this cause; and the first commencement of the formation of "sows" occurs also in nearly all cases during the stoppages, when the small doughy masses of reduced metallic iron have an opportunity to stick to the bottom of the crucible, which is no longer protected by a liquid mass. It is well known to every metallurgist, that whenever the foundation is laid for a "sow," it is extremely difficult to prevent its rapid growth; and even if the larger parts are broken or chiselled out at every tapping, the iron will continually gain on the smelter.

By the employment of the automatic tap the first formation of "sows" is evidently prevented. Even if there be much iron from the charge reduced to the metallic state, the lumps will not come in contact with the bottom, but will always swim on the lead-bath. Being here exposed to the oxidizing influence of the blast, they will be carried into the slag.

It need hardly be remarked that this arrangement for tapping is a continuous one, and that it carries the molten lead out from the *bottom* of the blast-furnace as fast as the metal is reduced inside. At the same time the lead smelted from the charge above remains in the crucible long enough to give the molten ingredients the required time to react upon each other, and separate according to specific gravity.

The lead obtained must be purer, because it is taken from the bottom of the crucible, where the purest (heaviest) metal gathers, and because the foreign metals, iron, zinc and antimony, are mostly oxidized and slagged before they are alloyed with the lead. The work of the smelters is of course considerably lightened, because, in addition to the tapping, the hard work of removing "sows," loosening the charge in the crucible after tapping, etc., is dispensed with.

I have not seen an extended description of the method here spoken of as yet, but it seems to me that the invention is one of the first importance for lead and copper smelting, and that its benefits to these branches of metallurgy will be found as great as those of the Luermann cinder-block have already proved themselves to the iron interest.

Reduction of certain Metals from their Solution by Metallic Sulphides, in Relation to the Occurrence of Such Metals in a Native State.*

Read before the Wellington Philosophical Society.

By WILLIAM SKEY, Analyst to the Geological Survey of New Zealand.

IN a paper read by Mr. C. WILKINSON, before the Royal Society of Victoria, "On the Formation of Gold Nuggets," publicity is given to the fact, first observed by Mr. DAINTREE, that gold, when placed in a solution of its chloride undergoing decomposition by contact with organic matter, determines the deposit of much or all the liberated gold upon itself. In the same paper, the author states that he finds copper, iron, and arsenical pyrites, galena, zinc blende, stibnite, wolfram, and molybdenite also act as nuclei for gold thus reduced, but that brown iron ore and quartz do not. The general correctness of these statements has been verified by the results of a critical inquiry, conducted by Mr. COSMO NEWBERRY, Analyst to the Geological Survey of Victoria; but I notice there has not been any attempt on the part of either of these authors to explain these very singular phenomena. That gold itself should be nuclear to gold slowly precipitating from its solution is by no means abnormal or unrelated to other phenomena; it is in fact, just what we should expect from a consideration of the mode of deposit of numerous other substances from their solutions. Whether such deposits are crystalline or amorphous, they generally tend to arrange themselves round a nucleus of their own substance; but, that substances so chemically dissimilar as those specified by Mr. WILKINSON, both as compared among themselves and to gold, should also be nuclear under these circumstances, appeared altogether so strange and anomalous, that I was induced to make further researches into this subject, for the purpose of ascertaining what other substances (if any) could be added to this list of nuclei rendered, and whether any of them could be nuclear for other metals during their slow precipitation, so that from any inquiry thus extended some general principle might be discovered regulating and explaining such deposits.

The results of these I now beg to lay before this Society. They have been so singular and unexpected, and have taken a direction so different to that contemplated for them, that I have had to change the title of this paper, as first adopted and worked to, into the one now assigned to it. I found, in the first place, on repeating the experiment adverted to, with certain modifications, that in the case of wolfram the tendency of gold to deposit thereon might properly be referred to the well-known reducing power of soluble proto-salts of iron upon salts of gold, since protoxide of iron forms a considerable portion of this mineral, and is actually dissolved away from it to a small extent by dilute acids at common temperatures—at least I found it so in the case of a specimen of it I had from the museum here. The case, therefore, so far as these results of Mr. WILKINSON'S are concerned, is reduced to one in which there only remains to consider the metallic sulphides and arsenides, a set of metals both chemically and mineralogically related to each other.

Now, in respect to these sulphides, it is distinctly stated in Mr. NEWBERRY'S paper that, in even "weak solutions" of terchloride of gold (the salt used in his experiments), "they decompose, but so slowly as not to interfere with the deposit taking place regularly." Having corroborated the correctness of this statement, and also proved that the arsenides are similarly affected, it occurred to me that (though hitherto quite unsuspected) this decomposition was very intimately connected with the first deposit of gold upon these sulphides; that, in reality, the commencement of metallic deposit was effected, not by the interaction of organic matter, as supposed, but by that of the several nuclei themselves with the salt of gold. I therefore agitated a little finely-powdered galena (sulphide of lead) with a weak solution of terchloride of gold, omitting the addition of organic matter, and taking every precaution against its presence accidentally, when I found, after a little while, the gold solution had become quite colorless, and on testing it not a trace of this metal could be found. It had evidently been absorbed, as it were, by the galena; and, in fact, a careful inspection of this mineral showed it to be feebly gilded. Small cubes of galena, simply immersed for a few hours in a strong solution of the gold salt without organic matter, were so thoroughly gilded over the greater part of their surfaces that in certain positions they could not be distinguished from gold by the eye. Chloride of gold was also found to be reduced by contact with the following sulphides (they include, as will be observed, all those mentioned by Mr. WILKINSON): Sulphides of iron (proto and bi-sulphide); sulphides of copper (ferro-sulphide and sub-sulphide); the sulphides of zinc, tin, molybdenum, lead, mercury, silver, antimony, bismuth, arsenic, platinum, and gold; and, among the arsenides, mispickel and arsenide of silver. Cubical iron pyrites is rather slow in its action upon this solution of gold, while sulphide of antimony scarcely affects it at first, but after some hours contact with it, reduction goes on rapidly, perhaps by aid of some galvanic action. All these effects were produced at common temperatures, with the exception of sulphide of bismuth, while other experiments with iron and copper pyrites prove similar effects are produced when all kind of light is excluded, so there is no reason to suppose that light has been concerned in any of these reactions.

I should state that, in the case of some of the highly-colored minerals, such as cinnabar and arsenide of silver, for instance, it is necessary to operate upon their streak, in order to obtain a visible deposit upon them at common temperatures within a reasonable time. With hot solutions, however, even these are well gilded in an hour or two. A portion of the metal of the sulphide was uniformly found in the solution afterwards, and also sulphuric acid; the mode, therefore, in which these effects were produced was evidently by the oxidation of both the constituents of the nucleus employed. Thus we have removed this singular anomaly of gold in the act of precipitating, selecting as nuclei substances so diverse as those cited, and while refusing others, which, in reality, differ no more from such non-metallic nuclei than do these from gold; as it certainly appears from these results that, whatever gold has been reduced by organic matter in the experiments quoted, would never deposit on these non-metallic nuclei *surface to surface*, but only upon *gold* already occupying such surfaces, reduced by the exercise of affinities far superior and swifter in their action than those involved in the decay of wood or other organic structures employed by Mr. WILKINSON in the experiments I have alluded to. Being so, therefore, the question next arose—Is organic matter, unnecessary as it certainly is for the commencement of gold deposits on these nuclei, is it necessary to continue them, and to give them that close coherent form obtained when such matters were administered? Experimentally, it appeared quite unnecessary for this, too, as it was found that the solution, after depositing a certain time, often gave films towards the angles of the nuclei, which were of some thickness, and which under the microscope appeared quite continuous. The reducing effects of metallic sulphides and arsenides upon salts of gold being thus manifested, it became of some interest to inquire whether or no any other metallic salts were capable of being reduced by these substances.

This part of the subject I have only slightly investigated, but enough has been discovered to show that silver and platinum, and possibly most or all the metals of the platinum series, are reducible in this way from their solutions in acids. Thus silver is reduced from either its nitrate or acetate very readily by galena, copper pyrites, and the inferior sulphides of iron and copper. From ammoniacal solutions, however, it is not reduced by any of these sulphides, not even when heated by them, excepting by sub-sulphide of copper. As precipitated by galena, the silver selects some angular portion of it to deposit on, and sometimes strikes off from this in beautiful arborescent form and minutely crystalline filaments, exactly like those which the metal generally assumes in its native state. Cubic iron pyrites, also stibnite, has little or no effect upon silver salts, not even when heated with them; arsenide of silver has, however, a feeble effect. The metal platinum is very slowly removed from its bichloride solution by galena and grey copper ore; also by iron pyrites, but at a still slower speed. These were the only sulphides tried. Mercury does not appear to be reduced to the metallic state by any of the sulphides enumerated from its bichloride solution, but most of them reduce it to the subchloride. Sulphide of gold even thus affects this mercurial salt, the sulphur being oxidized, and the gold set free. Neither the sulphate nor the acetate of copper are affected by these sulphides; but perchloride of iron is reduced to the protochloride by galena and grey copper ore.

Before I proceed to the next part of the subject, I had better state here the results I obtained when other gold solutions were administered to these sulphides, the one hitherto employed in the experiments described being, as will be remembered, the chloride. When, in the place of this salt, I applied the *oxide* (of gold) in solution of either potash, bicarbonate of soda, or an alkaline silicate, the same reduction of the metal followed—at least, this was the case for galena and the inferior sulphides of iron and copper. If the oxide is dissolved in ammonia, such results require for their production an elevation of the temperature of the solution to about 200 deg. F. In the case of the sulphide of gold, however, whether dissolved in any of these salts or alkalies, it was found this compound could not be reduced by contact with any of these sulphides, either at common temperatures or at the boiling-point of the particular solution employed, nor yet when strong deoxidising agents, such as tannic or gallic acids, were used along with such gold solutions. All this tends to show, I think, that in the case where Mr. NEWBERRY obtained the reduction of gold upon iron pyrites from a solution of its sulphide in bicarbonate of soda mixed with organic matter, the gold had, prior to the act of reduction, become in some way divested of its sulphur, and had taken up oxygen in exchange, thus passing to a salt readily reducible by deoxidising agents. During the period of time which had to be allowed by Mr. NEWBERRY for his experiment, the oxygen of the air might have oxidised the sulphur of the auriferous sulphide, as it does that of several other metallic sulphides, and so rendered him a gold compound amenable to the influence of deoxidising substances. Anyway, it is inconceivable how organic matter and metallic sulphides, singly or conjointly, can desulphurise a good sulphide. The effect of organic matter in a state of decay is rather to generate sulphides than to decompose them, thus retarding in the place of promoting the reduction of such compounds of gold. It is hard to suppose there could have been any chemical interchange effected by the mere addition of bicarbonate of soda to the gold sulphide, since gold has far more affinity for sulphur than for oxygen. It could hardly pass to an oxy-salt, therefore, in this manner. Besides, if it could, then reduction should have proceeded as well with this kind of solution as with the gold oxide in solution of bicarbonate of soda, which, as before stated, I found it did not. Further experiments in this direction are, however, absolutely necessitated by the importance of ascertaining positively whether there is any solution of gold (likely to occur naturally) able to resist the reducing power of either metallic sulphides or organic matter in a state of decay.

The several results arrived at in these investigations are now stated. It only remains, therefore, to point out, or, rather, to refer, to the very obvious relation they appear to sustain to the manner in which certain of our native metals are frequently associated. The great deoxidising power of sulphides generally upon most gold, silver, and platinum salts, as manifested by the experiments just described, renders them so absorbent, as it were, of these metals, that any such solutions traversing a very thin vein even or reef of the mixed metallic sulphides would, in all probability, be completely divested of these metals. Solutions of silver, however, would be little, if any, affected in traversing a reef of either iron pyrites or stibnite; but if, in addition to silver, the solution contained gold, it is very probable a certain portion of the silver would precipitate along with the gold as the result of a secondary action, that is, by a single chemical substitution. On the other hand, silver would readily be absorbed by veins of galena or inferior sulphides. All this certainly agrees very well with what we find on examination of these sulphides. Indeed, the facts just stated seem to explain very simply the constant or the frequent association of gold and silver with certain of our metallic sulphides, and their absence or comparative scarcity in others. Whether or no this is the reason of such association, the knowledge that certain metallic sulphides and arsenides are capable of reducing these metals from their solutions should, I think, be taken into careful consideration when we attempt to explain the origin of these metals in the forms they have taken and in the rocks or veins they have selected. As yet, every theory of any general acceptance which has been broached to explain the occurrence of such metallic deposits in these matrices is based upon the reducing action of organic matter, when the fact is, that most of the common sulphides are much superior in this respect to such matters, being far more rapid in their effects, and capable of reducing, weight for weight, more metal—a single grain of iron pyrites being sufficient to reduce 8 1-6 grains of gold. While, therefore, allowing that organic matter has had a share in the reduction of gold and other metals, I cannot but think that by far the greater portion of our gold and silver deposits, especially those situated in the deeper-seated rocks and lodes removed from carboniferous strata, have been wholly due to the deoxidising effects of pyritous minerals. Of course both theories require, as a common ground, that the metal shall first be in such a state of combination as to be soluble in water, a condition which is generally conceded to it, and which I have, therefore, taken all along as actually obtaining.

I cannot take leave of this subject without adverting to and commenting upon some of the singular chemical reactions which these researches have opened upon. In the first place, it has appeared that aqueous solutions of oxy-salts of gold, among which we must include the chlorides, for obvious reasons, possess oxidising power to an extent not hitherto contemplated for them, great as this may have been acknowledged. I think it is a little superior to that of chromic acid, since it attacks cubical pyrites pretty readily in the cold, while chromic acid scarcely affects it. Further, these salts of gold not only oxidise the metals of these sulphides, but their sulphur too; although I find, from direct experiment, neither common (sublimed) sulphur, nor yet sulphur precipitated from solution in alkalies, are the least affected by them, not even when these auriferous solutions are raised to their boiling-points. This vulnerability of combined sulphur, as against the invulnerability of the same substance when free, suggests the greatness of the change which sulphur in itself undergoes when it passes to a state of combination. Possibly some voltaic action facilitating this change may be set up by these several substances among themselves, in which the gold already reduced would form the negative element; but this does not, of course, explain how the oxidation commenced.—*Chemical News.*

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., WILLARD P. WARD, M. E., } Editors.

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Miners' Riot in California.

WITHIN the past few months the subject of miners' strikes has been so fully ventilated that but little remains to be said in general terms upon that subject.

The telegraphic reports from San Francisco of June 22d announce that the miners on a strike in Amador county have taken forcible possession of the mines, and refuse to allow even the working of the pumps to keep the mine free from water. There can be no doubt as to the illegality of such a proceeding, and the local authorities are represented as powerless to quell the disturbance. The 1st Regiment of the California National Guard, armed with Henry rifles, have been sent to the scene of the disorder, with orders to disperse the mob at all hazards.

The affair now bears a threatening aspect, and those acquainted with the reckless character of the California miners are fearful of serious consequences. Such violent measures at the outset of the strike, when the men have been working peacefully for years, is certainly not encouraging.

The Alleged New Alloy of Copper and Iron.

THE newspapers say that somebody in San Francisco has discovered a new alloy of copper and iron, which is harder than the latter metal, and that a company has been formed, to test his discovery.

We do not undertake to say that a new alloy of copper and iron may not be manufactured, though we are strongly inclined to believe that the gamut of combination of these two metals has been pretty thoroughly practised. But if the novelty of this San Francisco mixture lies in the fact only that it is harder than iron, there is nothing new about it; since the hardening of iron by an admixture of copper is a matter of ancient and familiar knowledge to metallurgists. A very small percentage of copper (less than one per cent.) makes wrought iron red-short, and injures the quality of steel still more. Yet wrought-iron has been found to contain 0.5 per cent, without serious defect in quality, and some steels contain 0.2 per cent. of copper. According to STENGEL, the red-shortness of wrought-iron begins with 0.44 per cent. of copper.

Cast-iron, on the other hand, is rendered harder and less soluble in acids by the presence of one per cent. of copper. For many years, the car-wheels on the Virginia and Tennessee Railroad were made of iron manufactured from the "gossan" of the outcrops of the copper deposits of Carroll and Floyd counties, Virginia. This cast-iron contained from two to two and a half per cent. of copper, and acquired a great reputation for hardness and toughness.

Even if such alloys had not been employed in practice, no metallurgist who had ever dealt with "iron-sows" or "salamanders" in the copper-blast furnace could have failed to learn to his cost that copper hardens iron. According to the analysis of STROMEYER, HEINE, GENTH, and others, these salamanders contain from 1.79 to 49.85 per cent. of copper; and as to their hardness, every smelter knows that they can scarcely be cut or broken when cold, while they are with difficulty removed, even when red-hot.

A Good Choice.

WE learn from the Kansas City *Journal of Commerce* that OLIVER CHANUTE, Esq., of that place, has accepted the appointment of General Superintendent and Chief Engineer of the Leavenworth, Lawrence and Galveston Railroad, and removed his headquarters to Lawrence. This is a local loss to Kansas City, but a gain to the growing railway interests of the West. Mr. CHANUTE, with whom our readers are acquainted as a valuable contributor to this journal, has distinguished himself in many ways, displaying an efficiency and marvellous industry and energy in the discharge of his duties as chief engineer in the construction of the Missouri River, Fort Scott and Gulf Railroad; of the Leavenworth, Lawrence and Galveston Railroad; of the Kansas City and Santa Fé Railroad; of the Atchison and Nebraska Railroad (an extension of the Missouri River road north of Atchison); of the Kansas City stock yards, and lately as Engineer of Kansas City. The achievement which has brought him most prominently before the professional public, is the construction, under circumstances of peculiar difficulty, of the Kansas City bridge over the Missouri river, several accounts of which have been given in our columns. The published report of Mr. CHANUTE on this work is additional evidence of his ability. The several enterprises under his direction have involved the expenditure of nearly fifteen million dollars, more than half of which has been disbursed by him personally. So much experience and such great success are a guarantee of his continued brilliant career.

The Reduction of Low Grade Gold Ores in Australia.

THE following account, published in 1867, we believe, in "The Gold Fields of Victoria," is still full of interest to American miners and mill-men, as showing what may be accomplished by economy:

When it was first announced that the Black Hill Company had succeeded in obtaining a satisfactory profit from quartz, giving the very low average of two (2) dwt. of gold per ton, the statement was received with some incredulity. Nothing less than an ounce per ton pays on Inglewood and on Sandhurst. Quartz giving from 5 to 6 dwt., has been regarded as too poor stuff to be worth much attention. But the achievement of the Black Hill Company was subsequently exceeded by the "New Perseverance," a co-operation company of small capital at work on "White Horse Flat," who were stated to be content with 1½ dwt. per ton. These statements undoubtedly were true, but the circumstances were exceptional, and the results illustrate the proposition that quartz mining is reduced to almost certain calculations. I take as my proof the Black Hill Company, whose works are situated on the Banks of the Yarrowee at the foot of the hill, which gives the company its name. Here, erected with a paid up capital of £24,000, the visitor will find the most complete and novel plan in the colony. The engine is a horizontal one of 100 horse-power. It is placed in the centre of the stamp house and drives six batteries of ten stamps each, the weight of the stamps being 700 lbs., and they are worked by wrought iron discs with steel faces and steeled cams. The lifters are turned, and revolve in anti-friction metal guides. The quartz is supplied to the Batteries by a self-feeding apparatus requiring the attention of one man only to the 60 stamps, and is reduced sufficiently fine to pass through wire gratings at the back and front of the stamp boxes, having 120 holes to the square inch. A small quantity of quicksilver is put into each stamp box twice a day; the crushed ore is carried through the gratings by the water into ripple boxes containing mercury, extending from both sides of the battery, and thence along some 24 feet of blanketing. These blankets are washed every eight hours in tanks which move upon wheels, and the sulphurets and sands collected by this process is conveyed into revolving barrels, with half its weight of mercury, and sufficient hot water for its proper amalgamation.

The mine consists of the principal portion of the Black Hill, and contains about 40 acres. Tunnels 9×7½ have been made into the hill at different levels, amalgamating in length to about 2500 feet. These tunnels are connected at several points with the open workings at the top of the hill by shafts, down which the quartz and mullock is shot, the quartz being conveyed to the mill by trucks on an iron railway, and the mullock to the waste heap.

The average width of the quartz lode is about 90 feet, with numerous leads running into it. The quantity of quartz crushed per week, is about 1000 tons, and the yield of gold for the three months preceding my visit, was 2. dwts 18 grs. to the ton. When the crushing stuff is mainly soft casing, however, from 1500 to 1700 tons can be got through; the 1500 average cost per ton for mining is 4s., and for crushing 2s. 10d. The number of men employed is 90, and of horses 4, of firewood 150 tons are used per week. The company have erected a small iron foundry in which they cast the stamp heads and other iron work required, and the average weight of iron work to be renewed is about one ton weekly. The supply of water is obtained from the Yarrowee creek, and is stored in reservoirs holding 1,500,000 gallons, A well supplied from the reservoir, is sunk in the stamp house, and from thence the water is forced by two plunger pumps (13 inches drain and throwing 500 gallons per minute) into a large tank, on the side of the hill holding 5000 gallons, and from that point distributed by pipes to all parts of the establishment. The whole of the machinery was designed by and erected under the superintendence of Mr. J. S. MARTIN, engineer of Melbourne, and the main portion of it was supplied by Messrs. LANGLANDS Brothers of Melbourne.

The hill on which the company operates was a favorite camping-ground in the early days of Ballarat, and around it, alluvial gave excellent returns. The Black Hill Company commenced upon it two years and a half ago, with an engine of forty-five horse-power and twelve stamps. They followed the old plan of shafts and drives, and they found that every ton of quartz they raised cost 13s. 6d. before it reached the stamps, a cost which exceeded, or, at least equalled, the value of the gold it contained. It was calculated that 9d. per ton was added to the price every time the quartz was turned over in its progress to the hill. These various considerations induced the Company (and the credit of an example of such practical value to the colony is mainly due to Mr. EDWARD A. WYNNE, the Chairman,) to remove the smaller plant, and to substitute for it the great body of stamps they now possess, fed so ingeniously, and with such small help that the cost of quartz per ton has been reduced to the price already stated, less the cost of the transfer through the tunnels to the feeding-troughs, or, say, 2½d. The whole hill is taken down from the surface in open quarry-like work, and reefs and veins, the latter standing out in every direction like the branches of a tree, are thus exposed to the miners, in place of being followed in long and badly-lighted "dives." The new machinery was set in motion some eight months ago, but the first three months were consumed in experiments, improvements, etc., which need not be further referred to. It was only in the end of March last that the battery was fully and finally at work, and I have before me the balance sheet, struck on the 30th June, showing the result of three months labor, the gold produced in the previous quarter having been expended in completing the work left unfinished by the local firm to whom the erection of the mill had been intrusted in the first instance. The profit on the quarter ending in June was £1689, or at the rate of 30 per cent. per annum. The amount actually divided was £1559 11s. 8d., or £6 per share, leaving a balance to be carried forward. During the fortnight preceding my visit 280 ozs. 4 dwt. of gold were obtained, and the average profits of the Company may now be set down at about £563 per month, equal to a return of the whole capital in three years and a half, and that from quartz and casing returning only 2¼ dwt. per ton. It is calculated that the hill cannot be cut down to the level of the stamps under a period of twenty years, and long before that day arrives the progress of invention may have introduced such better modes of reducing the quartz, and saving the gold, as to make even poorer quartz a source of profit. Even then, however, the Company will have vast masses of quartz before them. The works are situated at a level of 224 feet above that of the mill of the Wellingtonia Gigantia Company, a few score yards distant, and that Company are now working profitably quartz taken in drives, respectively 50, 100 and 250 feet beneath the surface. These lodes have been traced across into Black Hill, and it is further found that the stone gets richer as it gets deeper. With such an example before us, may it not be added, where is the quartz hill or reef in the Colony that may not be worked at a profit, if proper machinery is laid down for the work to be done, and *resolution* and perseverance under difficulties are shown such as those by which the Black Hill Company has been piloted through its difficulties? If the experience of the Black Hill Company needed verification by that of others, it would be found in that of the New Perseverance Company, to which I have already alluded. Together they form a phalanx of evidence that cannot be shaken.

Situated on the "White Horse Flat," this Company is also engaged in the reduction of an outcrop hill of mixed quartz and mullock. The stuff is run up a tramway of some 500 or 600 feet in length from the quarry to the mill. The quantity of quartz reduced is smaller, the stamps being smaller, and only 24 in number. The entire mill, however, was erected for less than £4000, including a second engine and the necessary gear for winding purposes. The milling gives little trouble, as there is a very large fall, and the rate of wages is somewhat less than is paid in other places. During the past year the profits have been about £1300, or about ½ of the entire capital. There are other cases known in which poor quartz is worked, not taken bodily, but with all the disadvantages attending mining by shafts and drives, with the greater cost of cutting and that of winding added. The Wellingtonia Gigantia Company may be cited, whose average of gold is small. In May last, for example, they crushed 1000 tons, giving an average of 3 dwts., an experience to which that of the "Hercules" of Brudigo is approximating. I might cite numerous others, conducted variously from the surveyor's reports, my time not having permitted me to look into their affairs myself. The Union Company, for instance, for this May crushing had an average of

2 dwts.	7 grs.	from	600	tons.	
5 "	0 "	"	430	"	Eureka Co.
4 "	0 "	"	250	"	Danish Co.
3 "	2½ "	"	800	"	Cornish United.
2 "	8 "	"	450	"	Canadian.
3 "	0 "	"	900	"	Old Canadian.
2 "	8 "	"	1100	"	
2 "	5 "	"	1200	"	
1 "	12 "	"	700	"	Two Two.
2 "	12 "	"	800	"	Golconda.

Some of the quartz companies have to deal with better stuff, BECKMAN & Co. having got from 40 tons 25 dwts.; Globe Co., 30 dwts. from 91 tons; the Band of Hope, 24 dwts. 8 grs. from 420 tons; and others from 7½ to 10 dwts. But, as a rule, the quartz of Ballarat is poor, the average yield of the stone per ton in one district, in the month referred to, having been only 4 dwts. 12 grs., and of another average 2 dwts. 17 grs.

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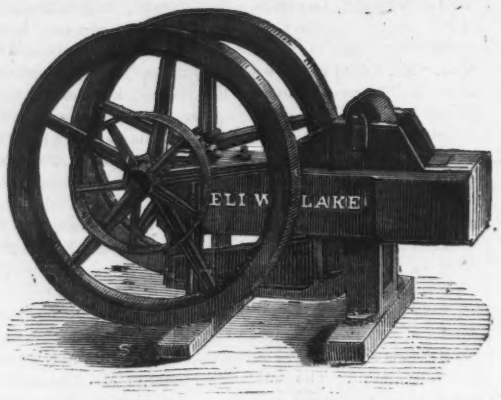

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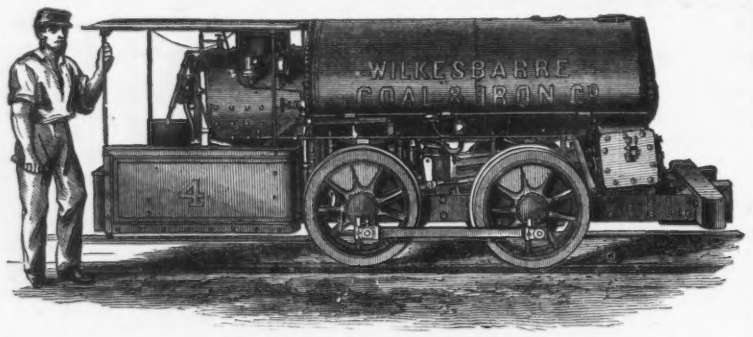

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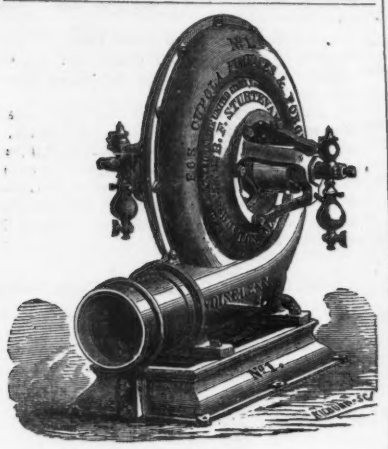

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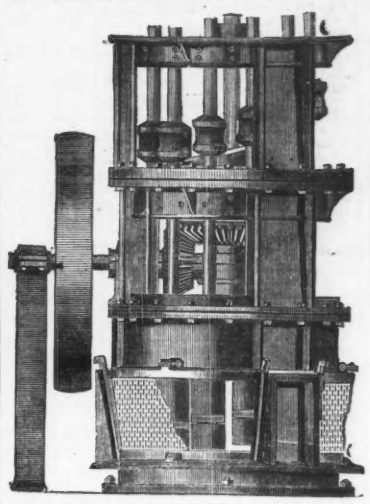

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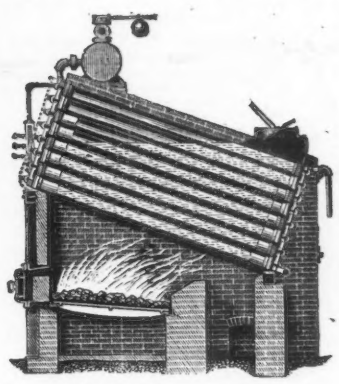

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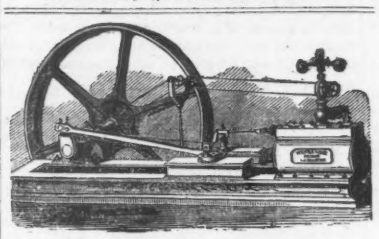

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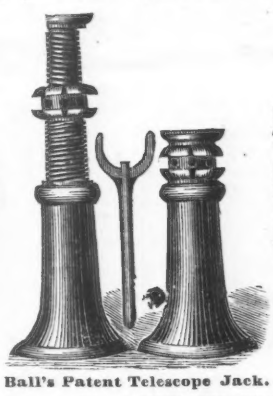

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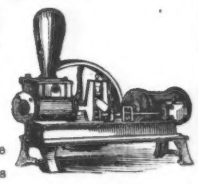

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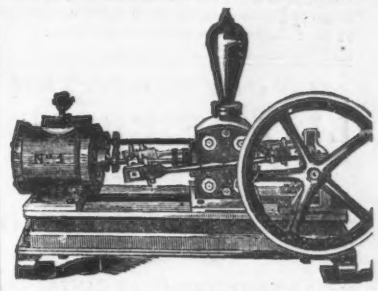

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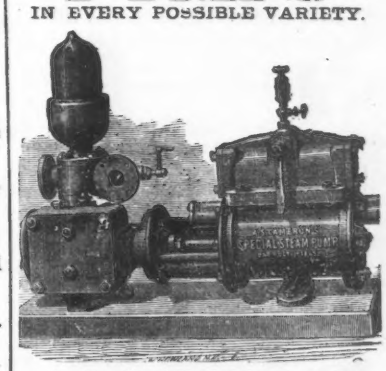

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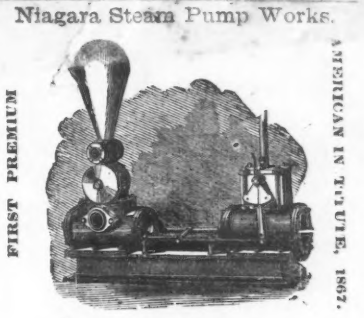

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A New Method of Tapping Blast-Furnaces Used for Lead Smelting.

By A. EILERS, M. E.

At the smelting works of the Eureka Consolidated Company, in Lander county, Nevada, the Piltz furnace has been in use for nearly a year, and the results obtained by that excellent furnace have been highly satisfactory. A very important improvement has been lately added to this furnace by Messrs. KEYES and ARENTS, the superintendent and the metallurgist of the company, which increases considerably the already astonishing results ob ained with this shaft-furnace. At the same time this improvement can be added, with only slight modifications, to all kinds of shaft-furnaces used for lead and copper-matte smelting; and its introduction is therefore of great importance to metallurgists. I speak of the antomatic tapping apparatus now in use at the above-named works, which consists simply in a pipe, introduced in the side of the furnace at the bottom of the crucible, from which it slants upwards ending in a kettle, the upper rim of which is at a level with the height of the lead-ba'h in the furnace, when the crucible is filled. It is claimed and proved by the actual working of this method of tapping, that—

1. The furnace runs more regularly.
2. The lead obtained is purer.
3. "Sows" are prevented.
4. The work of the smelters is lightened.

These results agree entirely with the theories bearing on the subject, as I shall show hereafter, but a fifth beneficial result might be added, namely, saving of fuel.

When the usual method of tapping a lead-furnace is followed, the blast is stopped and the tap-hole in the bottom of the crucible is opened (sometimes with great difficulty, when metal has cooled in it at a former tapping). The lead, matte and slag run out into the kettle, the hole is stopped again with clay or a mixture of clay and coal dust, called "stübbe," and the blast is turned on, and smelting resumed. With the cleaning of the crucible, building up of fore-hearth, etc., this part of the smelting often takes considerable time, and the temperature in the furnace is reduced, so that much fuel is burned to make up the lost heat. Irregularities in the running of the furnace are frequently directly traceable to this cause; and the first commencement of the formation of "sows" occurs also in nearly all cases during the stoppages, when the small doughy masses of reduced metallic iron have an opportunity to stick to the bottom of the crucible, which is no longer protected by a liquid mass. It is well known to every metallurgist, that whenever the foundation is laid for a "sow," it is extremely difficult to prevent its rapid growth; and even if the larger parts are broken or chiselled out at every tapping, the iron will continually gain on the smelter.

By the employment of the automatic tap the first formation of "sows" is evidently prevented. Even if there be much iron from the charge reduced to the metallic state, the lumps will not come in contact with the bottom, but will always swim on the lead-bath. Being here exposed to the oxidizing influence of the blast, they will be carried into the slag.

It need hardly be remarked that this arrangement for tapping is a continuous one, and that it carries the molten lead out from the *bottom* of the blast-furnace as fast as the metal is reduced inside. At the same time the lead smelted from the charge above remains in the crucible long enough to give the molten ingredients the required time to react upon each other, and separate according to specific gravity.

The lead obtained must be purer, because it is taken from the bottom of the crucible, where the purest (heaviest) metal gathers, and because the foreign metals, iron, zinc and antimony, are mostly oxidized and slagged before they are alloyed with the lead. The work of the smelters is of course considerably lightened, because, in addition to the tapping, the hard work of removing "sows," loosening the charge in the crucible after tapping, etc., is dispensed with.

I have not seen an extended description of the method here spoken of as yet, but it seems to me that the invention is one of the first importance for lead and copper smelting, and that its benefits to these branches of metallurgy will be found as great as those of the Luermann cinder-block have already proved themselves to the iron interest.

Reduction of certain Metals from their Solution by Metallic Sulphides, in Relation to the Occurrence of Such Metals In a Native State.*

Read before the Wellington Philosophical Society.

By WILLIAM SKEY, Analyst to the Geological Survey of New Zealand.

In a paper read by Mr. C. WILKINSON, before the Royal Society of Victoria, "On the Formation of Gold Nuggets," publicity is given to the fact, first observed by Mr. DAINTREE, that gold, when placed in a solution of its chloride undergoing decomposition by contact with organic matter, determines the deposit of much or all the liberated gold upon itself. In the same paper, the author states that he finds copper, iron, and arsenical pyrites, galena, zinc blende, stibnite, wolfram, and molybdenite also act as nuclei for gold thus reduced, but that brown iron ore and quartz do not. The general correctness of these statements has been verified by the results of a critical [illegible]y, conducted by Mr. COSMO NEWBERRY, Analyst [illegible]ical Survey of Victoria; but I notice there has [illegible] attempt on the part of either of these authors to [illegible] very singular phenomena. That gold itself should [illegible] gold slowly precipitating from its solution is by [illegible]ormal or unrelated to other phenomena; it is in [illegible]at we should expect from a consideration of the [illegible]it of numerous other substances from their so[illegible]ther such deposits are crystalline or amorphous, [illegible]tend to arrange themselves round a nucleus of [illegible]tance; but, that substances so chemically dissi[illegible]specified by Mr. WILKINSON, both as compared among themselves and to gold, should also be nuclear under these circumstances, appeared altogether so strange and anomalous, that I was induced to make further researches into this subject, for the purpose of ascertaining what other substances (if any) could be added to this list of nuclei rendered, and whether any of them could be nuclear for other metals during their slow precipitation, so that from any inquiry thus extended some general principle might be discovered regulating and explaining such deposits.

The results of these I now beg to lay before this Society. They have been so singular and unexpected, and have taken a direction so different to that contemplated for them, that I have had to change the title of this paper, as first adopted and worked to, into the one now assigned to it. I found, in the first place, on repeating the experiment adverted to, with certain modifications, that in the case of wolfram the tendency of gold to deposit thereon might properly be referred to the well-known reducing power of soluble proto-salts of iron upon salts of gold, since protoxide of iron forms a considerable portion of this mineral, and is actually dissolved away from it to a small extent by dilute acids at common temperatures—at least I found it so in the case of a specimen of it I had from the museum here. The case, therefore, so far as these results of Mr. WILKINSON's are concerned, is reduced to one in which there only remains to consider the metallic sulphides and arsenides, a set of metals both chemically and mineralogically related to each other.

Now, in respect to these sulphides, it is distinctly stated in Mr. NEWBERRY's paper that, in even "weak solutions" of terchloride of gold (the salt used in his experiments), "they decompose, but so slowly as not to interfere with the deposit taking place regularly." Having corroborated the correctness of this statement, and also proved that the arsenides are similarly affected, it occurred to me that (though hitherto quite unsuspected) this decomposition was very intimately connected with the first deposit of gold upon these sulphides; that, in reality, the commencement of metallic deposit was effected, not by the interaction of organic matter, as supposed, but by that of the several nuclei themselves with the salt of gold. I therefore agitated a little finely-powdered galena (sulphide of lead) with a weak solution of terchloride of gold, omitting the addition of organic matter, and taking every precaution against its presence accidentally, when I found, after a little while, the gold solution had become quite colorless, and on testing it not a trace of this metal could be found. It had evidently been absorbed, as it were, by the galena; and, in fact, a careful inspection of this mineral showed it to be feebly gilded. Small cubes of galena, simply immersed for a few hours in a strong solution of the gold salt without organic matter, were so thoroughly gilded over the greater part of their surfaces that in certain positions they could not be distinguished from gold by the eye. Chloride of gold was also found to be reduced by contact with the following sulphides (they include, as will be observed, all those mentioned by Mr. WILKINSON): Sulphides of iron (proto and bi-sulphide); sulphides of copper (ferro-sulphide and sub-sulphide); the sulphides of zinc, tin, molybdenum, lead, mercury, silver, antimony, bismuth, arsenic, platinum, and gold; and, among the arsenides, mispickel and arsenide of silver. Cubical iron pyrites is rather slow in its action upon this solution of gold, while sulphide of antimony scarcely affects it at first, but after some hours contact with it, reduction goes on rapidly, perhaps by aid of some galvanic action. All these effects were produced at common temperatures, with the exception of sulphide of bismuth; while other experiments with iron and copper pyrites prove similar effects are produced when all kind of light is excluded, so there is no reason to suppose that light has been concerned in any of these reactions.

I should state that, in the case of some of the highly-colored minerals, such as cinnabar and arsenide of silver, for instance, it is necessary to operate upon their streak, in order to obtain a visible deposit upon them at common temperatures within a reasonable time. With hot solutions, however, even these are well gilded in an hour or two. A portion of the metal of the sulphide was uniformly found in the solution afterwards, and also sulphuric acid; the mode, therefore, in which these effects were produced was evidently by the oxidation of both the constituents of the nucleus employed. Thus we have removed this singular anomaly of gold in the act of precipitating, selecting as nuclei substances so diverse as those cited, and while refusing others, which, in reality, differ no more from such non-metallic nuclei than do these from gold; as it certainly appears from these results that, whatever gold has been reduced by organic matter in the experiments quoted, would never deposit on these non-metallic nuclei *surface to surface*, but only upon *gold* already occupying such surfaces, reduced by the exercise of affinities far superior and swifter in their action than those involved in the decay of wood or other organic structures employed by Mr. WILKINSON in the experiments I have alluded to. Being so, therefore, the question next arose—Is organic matter, unnecessary as it certainly is for the commencement of gold deposits on these nuclei, is it necessary to continue them, and to give them that close coherent form obtained when such matters were administered? Experimentally, it appeared quite unnecessary for this, too, as it was found that the solution, after depositing a certain time, often gave films towards the angles of the nuclei, which were of some thickness, and which under the microscope appeared quite continuous. The reducing effects of metallic sulphides and arsenides upon salts of gold being thus manifested, it became of some interest to inquire whether or no any other metallic salts were capable of being reduced by these substances.

This part of the subject I have only slightly investigated, but enough has been discovered to show that silver and platinum, and possibly most or all the metals of the platinum series, are reducible in this way from their solutions in acids. Thus silver is reduced from either its nitrate or acetate very readily by galena, copper pyrites, and the inferior sulphides of iron and copper. From ammoniacal solutions, however, it is not reduced by any of these sulphides, not even when heated by them, excepting by sub-sulphide of copper. As precipitated by galena, the silver selects some angular portion of it to deposit on, and sometimes strikes off from this in beautiful arborescent form and minutely crystalline filaments, exactly like those which the metal generally assumes in its native state. Cubic iron pyrites, also stibnite, has little or no effect upon silver salts, not even when heated with them; arsenide of silver has, however, a feeble effect. The metal platinum is very slowly removed from its bichloride solution by galena and grey copper ore; also by iron pyrites, but at a still slower speed. These were the only sulphides tried. Mercury does not appear to be reduced to the metallic state by any of the sulphides enumerated from its bichloride solution, but most of them reduce it to the subchloride. Sulphide of gold even thus affects this mercurial salt, the sulphur being oxidized, and the gold set free. Neither the sulphate nor the acetate of copper are affected by these sulphides; but perchloride of iron is reduced to the protochloride by galena and grey copper ore.

Before I proceed to the next part of the subject, I had better state here the results I obtained when other gold solutions were administered to these sulphides, the one hitherto employed in the experiments described being, as will be remembered, the chloride. When, in the place of this salt, I applied the *oxide* (of gold) in solution of either potash, bicarbonate of soda, or an alkaline silicate, the same reduction of the metal followed—at least, this was the case for galena and the inferior sulphides of iron and copper. If the oxide is dissolved in ammonia, such results require for their production an elevation of the temperature of the solution to about 200 deg. F. In the case of the sulphide of gold, however, whether dissolved in any of these salts or alkalies, it was found this compound could not be reduced by contact with any of these sulphides, either at common temperatures or at the boiling-point of the particular solution employed, nor yet when strong deoxidising agents, such as tannic or gallic acids, were used along with such gold solutions. All this tends to show, I think, that in the case where Mr. NEWBERRY obtained the reduction of gold upon iron pyrites from a solution of its sulphide in bicarbonate of soda mixed with organic matter, the gold had, prior to the act of reduction, become in some way divested of its sulphur, and had taken up oxygen in exchange, thus passing to a salt readily reducible by deoxidising agents. During the period of time which had to be allowed by Mr. NEWBERRY for his experiment, the oxygen of the air might have oxidised the sulphur of the auriferous sulphide, as it does that of several other metallic sulphides, and so rendered him a gold compound amenable to the influence of deoxidising substances. Anyway, it is inconceivable how organic matter and metallic sulphides, singly or conjointly, can desulphurise a good sulphide. The effect of organic matter in a state of decay is rather to generate sulphides than to decompose them, thus retarding in the place of promoting the reduction of such compounds of gold. It is hard to suppose there could have been any chemical interchange effected by the mere addition of bicarbonate of soda to the gold sulphide, since gold has far more affinity for sulphur than for oxygen. It could hardly pass to an oxy-salt, therefore, in this manner. Besides, if it could, then reduction should have proceeded as well with this kind of solution as with the gold oxide in solution of bicarbonate of soda, which, as before stated, I found it did not. Further experiments in this direction are, however, absolutely necessitated by the importance of ascertaining positively whether there is any solution of gold (likely to occur naturally) able to resist the reducing power of either metallic sulphides or organic matter in a state of decay.

The several results arrived at in these investigations are now stated. It only remains, therefore, to point out, or, rather, to refer, to the very obvious relation they appear to sustain to the manner in which certain of our native metals are frequently associated. The great deoxidising power of sulphides generally upon most gold, silver, and platinum salts, as manifested by the experiments just described, renders them so absorbent, as it were, of these metals, that any such solutions traversing a very thin vein even or reef of the mixed metallic sulphides would, in all probability, be completely divested of these metals. Solutions of silver, however, would be little, if any, affected in traversing a reef of either iron pyrites or stibnite; but if, in addition to silver, the solution contained gold, it is very probable a certain portion of the silver would precipitate along with the gold as the result of a secondary action, that is, by a single chemical substitution. On the other hand, silver would readily be absorbed by veins of galena or inferior sulphides. All this certainly agrees very well with what we find on examination of these sulphides. Indeed, the facts just stated seem to explain very simply the constant or the frequent association of gold and silver with certain of our metallic sulphides, and their absence or comparative scarcity in others. Whether or no this is the reason of such association, the knowledge that certain metallic sulphides and arsenides are capable of reducing these metals from their solutions should, I think, be taken into careful consideration when we attempt to explain the origin of these metals in the forms they have taken and in the rocks or veins they have selected. As yet, every theory of any general acceptance which has been broached to explain the occurrence of such metallic deposits in these matrices is based upon the reducing action of organic matter, when the fact is, that most of the common sulphides are much superior in this respect to such matters, being far more rapid in their effects, and capable of reducing, weight for weight, more metal—a single grain of iron pyrites being sufficient to reduce 8 1-6 grains of gold. While, therefore, allowing that organic matter has had a share in the reduction of gold and other metals, I cannot but think that by far the greater portion of our gold and silver deposits, especially those situated in the deeper-seated rocks and lodes removed from carboniferous strata, have been wholly due to the deoxidising effects of pyritous minerals. Of course both theories require, as a common ground, that the metal shall first be in such a state of combination as to be soluble in water, a condition which is generally conceded to it, and which I have, therefore, taken all along as actually obtaining.

I cannot take leave of this subject without adverting to and commenting upon some of the singular chemical reactions which these researches have opened upon. In the first place, it has appeared that aqueous solutions of oxy-salts of gold, among which we must include the chlorides, for obvious reasons, possess oxidising power to an extent not hitherto contemplated for them, great as this may have been acknowledged. I think it is a little superior to that of chromic acid, since it attacks cubical pyrites pretty readily in the cold, while chromic acid scarcely affects it. Further, these salts of gold not only oxidise the metals of these sulphides, but their sulphur too; although I find, from direct experiment, neither common (sublimed) sulphur, nor yet sulphur precipitated from solution in alkalies, are the least affected by them, not even when these auriferous solutions are raised to their boiling-points. This vulnerability of combined sulphur, as against the invulnerability of the same substance when free, suggests the greatness of the change which sulphur in itself undergoes when it passes to a state of combination. Possibly some voltaic action facilitating this change may be set up by these several substances among themselves, in which the gold already reduced would form the negative element; but this does not, of course, explain how the oxidation commenced.—*Chemical News.*

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., WILLARD P. WARD, M. E., } Editors.

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Miners' Riot in California.

WITHIN the past few months the subject of miners' strikes has been so fully ventilated that but little remains to be said in general terms upon that subject.

The telegraphic reports from San Francisco of June 22d announce that the miners on a strike in Amador county have taken forcible possession of the mines, and refuse to allow even the working of the pumps to keep the mine free from water. There can be no doubt as to the illegality of such a proceeding, and the local authorities are represented as powerless to quell the disturbance. The 1st Regiment of the California National Guard, armed with Henry rifles, have been sent to the scene of the disorder, with orders to disperse the mob at all hazards.

The affair now bears a threatening aspect, and those acquainted with the reckless character of the California miners are fearful of serious consequences. Such violent measures at the outset of the strike, when the men have been working peacefully for years, is certainly not encouraging.

The Alleged New Alloy of Copper and Iron.

THE newspapers say that somebody in San Francisco has discovered a new alloy of copper and iron, which is harder than the latter metal, and that a company has been formed, to test his discovery.

We do not undertake to say that a new alloy of copper and iron may not be manufactured, though we are strongly inclined to believe that the gamut of combination of these two metals has been pretty thoroughly practised. But if the novelty of this San Francisco mixture lies in the fact only that it is harder than iron, there is nothing new about it; since the hardening of iron by an admixture of copper is a matter of ancient and familiar knowledge to metallurgists. A very small percentage of copper (less than one per cent.) makes wrought iron red-short, and injures the quality of steel still more. Yet wrought-iron has been found to contain 0.5 per cent, without serious defect in quality, and some steels contain 0.2 per cent. of copper. According to STENGEL, the red-shortness of wrought-iron begins with 0.44 per cent. of copper.

Cast-iron, on the other hand, is rendered harder and less soluble in acids by the presence of one per cent. of copper. For many years, the car-wheels on the Virginia and Tennessee Railroad were made of iron manufactured from the "gossan" of the outcrops of the copper deposits of Carroll and Floyd counties, Virginia. This cast-iron contained from two to two and a half per cent. of copper, and acquired a great reputation for hardness and toughness.

Even if such alloys had not been employed in practice, no metallurgist who had ever dealt with "iron-sows" or "salamanders" in the copper-blast furnace could have failed to learn to his cost that copper hardens iron. According to the analysis of STROMEYER, HEINE, GENTH, and others, these salamanders contain from 1.79 to 49.85 per cent. of copper; and as to their hardness, every smelter knows that they can scarcely be cut or broken when cold, while they are with difficulty removed, even when red-hot.

A Good Choice.

WE learn from the Kansas City *Journal of Commerce* that OLIVER CHANUTE, Esq., of that place, has accepted the appointment of General Superintendent and Chief Engineer of the Leavenworth, Lawrence and Galveston Railroad, and removed his headquarters to Lawrence. This is a local loss to Kansas City, but a gain to the growing railway interests of the West. Mr. CHANUTE, with whom our readers are acquainted as a valuable contributor to this journal, has distinguished himself in many ways, displaying an efficiency and marvellous industry and energy in the discharge of his duties as chief engineer in the construction of the Missouri River, Fort Scott and Gulf Railroad; of the Leavenworth, Lawrence and Galveston Railroad; of the Kansas City and Santa Fé Railroad; of the Atchison and Nebraska Railroad (an extension of the Missouri River road north of Atchison); of the Kansas City stock yards, and lately as Engineer of Kansas City. The achievement which has brought him most prominently before the professional public, is the construction, under circumstances of peculiar difficulty, of the Kansas City bridge over the Missouri river, several accounts of which have been given in our columns. The published report of Mr. CHANUTE on this work is additional evidence of his ability. The several enterprises under his direction have involved the expenditure of nearly fifteen million dollars, more than half of which has been disbursed by him personally. So much experience and such great success are a guarantee of his continued brilliant career.

The Reduction of Low Grade Gold Ores in Australia.

THE following account, published in 1867, we believe, in "The Gold Fields of Victoria," is still full of interest to American miners and mill-men, as showing what may be accomplished by economy:

When it was first announced that the Black Hill Company had succeeded in obtaining a satisfactory profit from quartz, giving the very low average of two (2) dwt. of gold per ton, the statement was received with some incredulity. Nothing less than an ounce per ton pays on Inglewood and on Sandhurst. Quartz giving from 5 to 6 dwt., has been regarded as too poor stuff to be worth much attention. But the achievement of the Black Hill Company was subsequently exceeded by the "New Perseverance," a co-operation company of small capital at work on "White Horse Flat," who were stated to be content with 1½ dwt. per ton. These statements undoubtedly were true, but the circumstances were exceptional, and the results illustrate the proposition that quartz mining is reduced to almost certain calculations. I take as my proof the Black Hill Company, whose works are situated on the Banks of the Yarrowee at the foot of the hill, which gives the company its name. Here, erected with a paid up capital of £24,000, the visitor will find the most complete and novel plan in the colony. The engine is a horizontal one of 100 horse-power. It is placed in the centre of the stamp house and drives six batteries of ten stamps each, the weight of the stamps being 700 lbs., and they are worked by wrought iron discs with steel faces and steeled cams. The lifters are turned, and revolve in anti-friction metal guides. The quartz is supplied to the Batteries by a self-feeding apparatus requiring the attention of one man only to the 60 stamps, and is reduced sufficiently fine to pass through wire gratings at the back and front of the stamp boxes, having 120 holes to the square inch. A small quantity of quicksilver is put into each stamp box twice a day; the crushed ore is carried through the gratings by the water into ripple boxes containing mercury, extending from both sides of the battery, and thence along some 24 feet of blanketing. These blankets are washed every eight hours in tanks which move upon wheels, and the sulphurets and sands collected by this process is conveyed into revolving barrels, with half its weight of mercury, and sufficient hot water for its proper amalgamation.

The mine consists of the principal portion of the Black Hill, and contains about 40 acres. Tunnels 9×7½ have been made into the hill at different levels, amalgamating in length to about 2500 feet. These tunnels are connected at several points with the open workings at the top of the hill by shafts, down which the quartz and mullock is shot, the quartz being conveyed to the mill by trucks on an iron railway, and the mullock to the waste heap.

The average width of the quartz lode is about 90 feet, with numerous leads running into it. The quantity of quartz crushed per week, is about 1000 tons, and the yield of gold for the three months preceding my visit, was 2. dwts 18 grs. to the ton. When the crushing stuff is mainly soft casing, however, from 1500 to 1700 tons can be got through; the 1500 average cost per ton for mining is 4s., and for crushing 2s. 10d. The number of men employed is 90, and of horses 4, of firewood 150 tons are used per week. The company have erected a small iron foundry in which they cast the stamp heads and other iron work required, and the average weight of iron work to be renewed is about one ton weekly. The supply of water is obtained from the Yarrowee creek, and is stored in reservoirs holding 1,500,000 gallons, A well supplied from the reservoir, is sunk in the stamp house, and from thence the water is forced by two plunger pumps (13 inches drain and throwing 500 gallons per minute) into a large tank, on the side of the hill holding 5000 gallons, and from that point distributed by pipes to all parts of the establishment. The whole of the machinery was designed by and erected under the superintendence of Mr. J. S. MARTIN, engineer of Melbourne, and the main portion of it was supplied by Messrs. LANGLANDS Brothers of Melbourne.

The hill on which the company operates was a favorite camping-ground in the early days of Ballarat, and around it, alluvial gave excellent returns. The Black Hill Company commenced upon it two years and a half ago, with an engine of forty-five horse-power and twelve stamps. They followed the old plan of shafts and drives, and they found that every ton of quartz they raised cost 13s. 6d. before it reached the stamps, a cost which exceeded, or, at least equalled, the value of the gold it contained. It was calculated that 9d. per ton was added to the price every time the quartz was turned over in its progress to the hill. These various considerations induced the Company (and the credit of an example of such practical value to the colony is mainly due to Mr. EDWARD A. WYNNE, the Chairman,) to remove the smaller plant, and to substitute for it the great body of stamps they now possess, fed so ingeniously, and with such small help that the cost of quartz per ton has been reduced to the price already stated, less the cost of the transfer through the tunnels to the feeding-troughs, or, say, 2½d. The whole hill is taken down from the surface in open quarry-like work, and reefs and veins, the latter standing out in every direction like the branches of a tree, are thus exposed to the miners, in place of being followed in long and badly-lighted "dives." The new machinery was set in motion some eight months ago, but the first three months were consumed in experiments, improvements, etc., which need not be further referred to. It was only in the end of March last that the battery was fully and finally at work, and I have before me the balance sheet, struck on the 30th June, showing the result of three months labor, the gold produced in the previous quarter having been expended in completing the work left unfinished by the local firm to whom the erection of the mill had been intrusted in the first instance. The profit on the quarter ending in June was £1689, or at the rate of 30 per cent. per annum. The amount actually divided was £1559 11s. 8d., or £6 per share, leaving a balance to be carried forward. During the fortnight preceding my visit 280 ozs. 4 dwt. of gold were obtained, and the average profits of the Company may now be set down at about £563 per month, equal to a return of the whole capital in three years and a half, and that from quartz and casing returning only 2¼ dwt. per ton. It is calculated that the hill cannot be cut down to the level of the stamps under a period of twenty years, and long before that day arrives the progress of invention may have introduced such better modes of reducing the quartz, and saving the gold, as to make even poorer quartz a source of profit. Even then, however, the Company will have vast masses of quartz before them. The works are situated at a level of 224 feet above that of the mill of the Wellingtonia Gigantia Company, a few score yards distant, and that Company are now working profitably quartz taken in drives, respectively 50, 100 and 250 feet beneath the surface. These lodes have been traced across into Black Hill, and it is further found that the stone gets richer as it gets deeper. With such an example before us, may it not be added, where is the quartz hill or reef in the Colony that may not be worked at a profit, if proper machinery is laid down for the work to be done, and resolution and perseverance under difficulties are shown such as those by which the Black Hill Company has been piloted through its difficulties? If the experience of the Black Hill Company needed verification by that of others, it would be found in that of the New Perseverance Company, to which I have already alluded. Together they form a phalanx of evidence that cannot be shaken.

Situated on the "White Horse Flat," this Company is also engaged in the reduction of an entire hill of mixed quartz and mullock. The stuff is run up a tramway of some 500 or 600 feet in length from the quarry to the mill. The quantity of quartz reduced is smaller, the stamps being smaller, and only 24 in number. The entire mill, however, was erected for less than £4000, including a second engine and the necessary gear for winding purposes. The milling gives little trouble, as there is a very large fall, and the rate of wages is somewhat less than is paid in other places. During the past year the profits have been about £1300, or about ½ of the entire capital. There are other cases known in which poor quartz is worked, not taken bodily, but with all the disadvantages attending mining by shafts and drives, with the greater cost of cutting and that of winding added. The Wellingtonia Gigantia Company may be cited, whose average of gold is small. In May last, for example, they crushed 1000 tons, giving an average of 3 dwts., an experience to which that of the "Hercules" of Brudigo is approximating. I might cite numerous others, conducted variously from the surveyor's reports, my time not having permitted me to look into their affairs myself. The Union Company, for instance, for this May crushing had an average of

2 dwts.	7 grs.	from	600	tons.	
5 "	0 "	"	430	"	Eureka Co.
4 "	0 "	"	250	"	Danish Co.
3 "	2½ "	"	800	"	Cornish United.
2 "	8 "	"	450	"	Canadian.
3 "	0 "	"	900	"	Old Canadian.
2 "	8 "	"	1100	"	
2 "	5 "	"	1200	"	
1 "	12 "	"	700	"	Two Two.
2 "	12 "	"	800	"	Golconda.

Some of the quartz companies have to deal with better stuff, BECKMAN & Co. having got from 40 tons 25 dwts.; Globe Co., 30 dwts. from 91 tons; the Band of Hope, 24 dwts. 8 grs. from 420 tons; and others from 7½ to 10 dwts. But, as a rule, the quartz of Ballarat is poor; the average yield of the stone per ton in one district, in the month referred to, having been only 4 dwts. 12 grs., and of another average 2 dwts. 17 grs.

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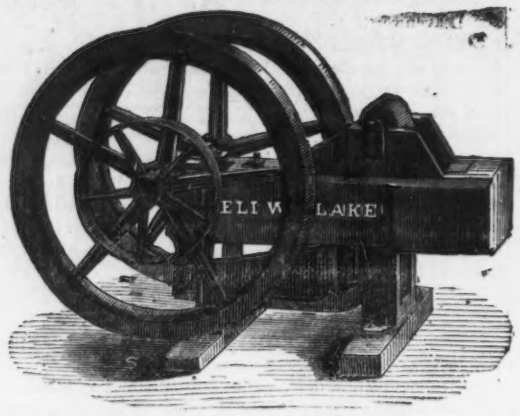

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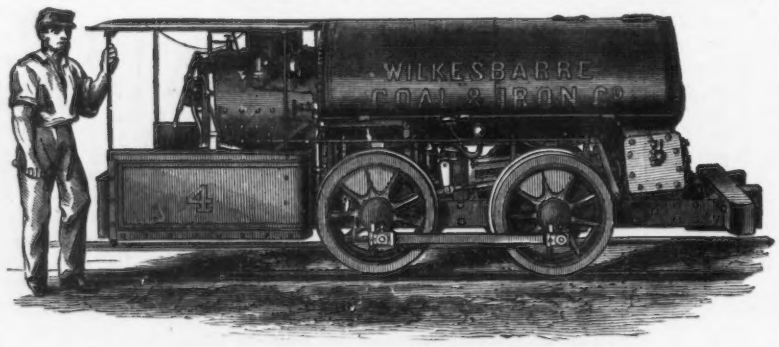

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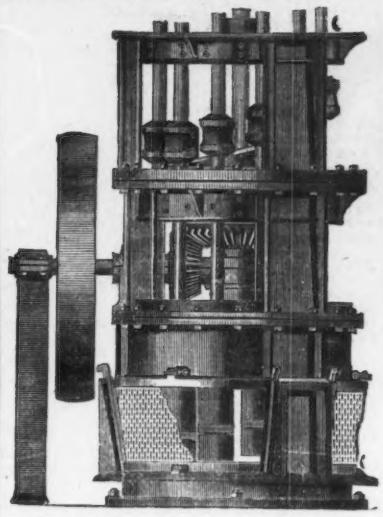

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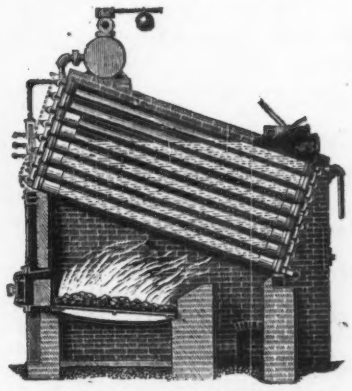

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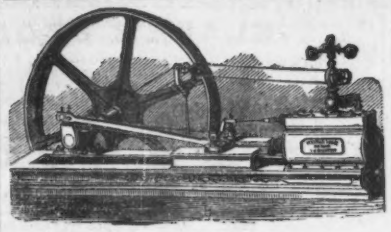

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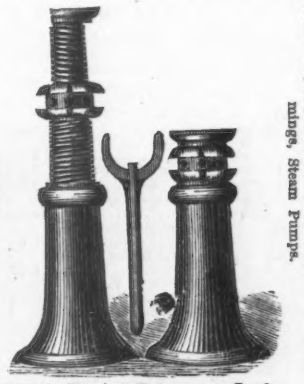

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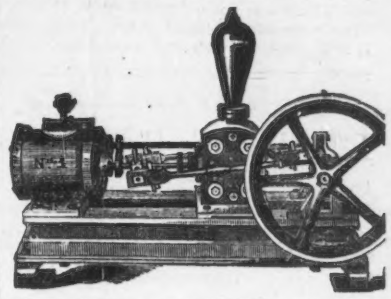

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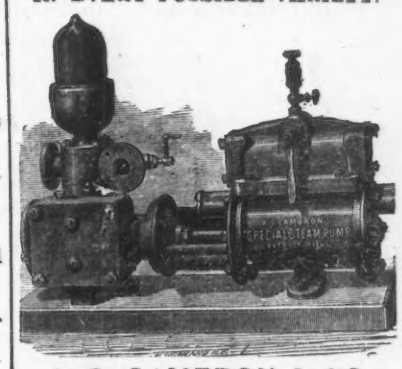

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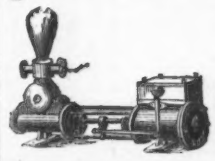

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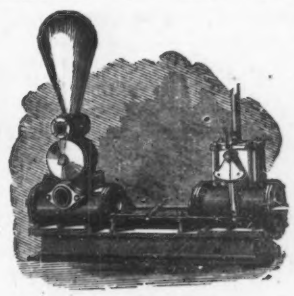

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127	—Gold Watch	100 00	100	300
128	—Silver Watch	104 00	104	312
129	—A Sewing Machine (your choice)	65 00	65	200
	FROM MCALLISTER.			
130	—Microscope and 48 objects	10 00	14	40
	FROM COLBY BROS. & CO.			
131	—Velocipede for Boys	16 00	16	52
	FROM MCALLISTER.			
132	—Magic-Lantern, No. 433	20 00	30	95
	FROM H. THOMPSON.			
133	—An Easy Chair			
	FROM D. APPLETON & CO.			
134	—New American Cyclopædia, 16 vols.	80 00	80	213
	FROM G. & C. MERRIAM.			
135	—Webster's Unabridged Pictorial Dictionary	12 00	15	45
136	—Webster's National Pictorial Dictionary	6 00	10	35
	FROM WESTERN & COMPANY.			
137	—One back vol. Manufacturer and Builder, unbound, post-paid	1 75	6	25
138	—Two back volumes Manufacturer and Builder, unbound, post-paid	3 50	11	37
139	—One back vol. Manufacturer and Builder, bound, post-paid	2 50	9	32
140	—Two back volumes Manufacturer and Builder, bound, post-paid	5 00	18	58
141	—Cover for binding the Manufacturer and Builder, post-paid	60	3	21
142	—A $10 Library (your choice from list in special sheet),	10 00	18	58
143	—A $15 Library,	15 00	24	85
144	—A $20 Library,	20 00	31	106
145	—A $25 Library,	25 00	38	125
146	—A $30 Library,	30 00	44	144
147	—A $35 Library,	35 00	50	162
148	—A $40 Library,	40 00	56	177
149	—A $45 Library,	45 00	62	192
150	—A $50 Library,	50 00	68	207
151	—A $60 Library,	60 00	80	237
152	—A $75 Library,	75 00	100	282
153	—A $100 Library,	100 00	125	360

All paid through by mail or express.

154	—A choice of good Books (see terms in another column)			
155	—A choice of convenient Book-Cases (see special sheet)			
156	—A choice of popular Music (see terms in special sheet)			
157	—A choice of Games and Toys, (see terms in special sheet)			

We have taken especial pains to select in making up our price list the NEWEST and very BEST articles. No charge will be made for boxing or packing any article on our list. The Premiums, Nos. **4** to **7** inclusive, **31** to **35** inclusive, **75** **99, 101, 105** to **108** inclusive, **121** to **128** inclusive, **137** to **141** inclusive, **154, 156. 157,** will each be delivered FREE of charge by mail or express (at the Post-office or express office nearest recipient) to any place in the United States or Territories. The other articles cost the recipient only the freight after leaving the manufactory of each, by any conveyance specified.

As an aid to those who engage upon large clubs, we will count subscriptions by *one* individual for 1869, 1870, and 1871, as *three* subscribers toward a premium. Every *new* subscriber should have the work from the beginning. Bound volumes may be counted in the same way—each as one subscriber—except, of course, when they are obtained as a premium.

Do not fail to note the following Points:

1. All subscribers sent by one person count, though from one or a dozen different post-offices. But

2. State with each name or list of names sent that it is for a premium.

3. Send the names as fast as obtained, that the subscribers may begin to receive the paper at once. You can have any time, from one to six months, to fill up your list.

4. Send the exact money with each list of names, so that there may be no confusion of money accounts.

5. Old and new subscribers all count in premium clubs, but a portion, at least, should be new names; it is partly to get these that we offer premiums to canvassers.

6. Specimen numbers, cards, and show-bills will be supplied free, as needed by canvassers; but they should be used carefully and economically, as they are very costly.

7. Remit money in Checks on New York banks or bankers, payable to order of WESTERN & COMPANY, or send Post-Office Money Orders. If neither of these is obtainable, Register Money Letters, affixing stamps both for the postage and registry; put in the money and seal the letter in the presence of the postmaster, and take his receipt for it. Money sent in any of the above ways is at our risk.

DESCRIPTIVE LIST OF PREMIUMS.

Every Premium in the annexed list is described in the December MANUFACTURER AND BUILDER, *and also in a* **Special Descriptive Sheet,** *which will be sent* **free** *to every one desiring it. We have room here for the following only:*

No. 1—Chest of Good Tools.—We are able, through the special favor of Messrs. Patterson Brothers, of 27 Park Row, to offer chests of the very finest quality of tools, of kinds and prices named below. Similar tools could be purchased for half the money; but these are all A No. 1, for practical use, and worth a dozen common articles. For this we have the guarantee of Messrs. Patterson, which is amply sufficient for us, and for all who know them. Any of these tools may be ordered of them. We make up only a single premium, which contains a full assortment for all common purposes. The tools are of regular size, and but few additions would be required for a journeyman carpenter. The assortment we offer is as follows: 1 tool-chest, $3; 1 jack-plane, $1 75; 1 smooth-plane, $1 50; 1 fore-plane, $2 25; 1 handsaw, 22 in., $1 75; 1 compass saw, 10 in., 50c.; compass, 6 in., 37c.; 1 adze-eye hammer, No. 4, $1 25; 1 hatchet, No. 2, 90c.; 1 draw-knife, 7 in., $1 12; 1 try-square, 6 in., 70c.; 1 bevel, 8 in., 75c.; 1 chalk-line and spool, 30c.; 1 mallet, 30c.; 1 pair of pliers, (steel,) 5 in., 60c.; 1 pair of calipers, 4 in., 36c.; 1 brace, No. 2, $2 25; 1 auger-bit, ea., ¼ in., 30c.; ½ in., 32c.; ¾ in., 45c.; 1 in., 60c.; 1 centre-bit, ea., ½ in., 21c.; ¾ in., 23c.; 1 in., 25c.; 1¼ in., 35c.; 1½ in., 40c.; 6 gimlet-bits, assorted, 90c.; 3 gimlet-bits, assorted, 33c.; 1 screw-driver bit, 25c.; 1 flat countersink, 25c.; rose, do., 25c.; snail, do,, 25c.; 1 octagon reamer, 30c.; 1 taper-bit, 30c.; 1 screw-driver in handle, ea., 3 in., 30c.; 6 in., 50c.; 1 gouge in handle, ea., ½ in., 50c.; 1 in., 70c.; 1 chisel in handle, ea., ¼ in., 30c.; ½ in., 35c.; ¾ in., 40c.; 1 in., 50c.; 1¼ in., 60c.; 1 framing-chisel, ea., ¾ in., $1; 1 in., $1 10; 1¼ in., $1 20; 1 auger, ea., ¾ in., 70c.; 1 in., 80c.; 1¼ in., 90c.; 1 set bradawls in handles, $1 35; 1 rule, 2 feet, 25c.; 1 saw file, ea., 4 in., 14c.; 5 in., 17c.; 1 flat bastard file, 8 in., 30c.; 1 wood-rasp, 50c.; 1 soldering copper, 60c.; solder nails, etc., $1 25;=**$45 00.**

Nos. 2, 3—Mathematical Instruments for Draughting, Drawing, Etc.—Very convenient not only for architects and mechanics, but for boys and girls. These are neatly fitted in beautiful rosewood cases, having dividers with flexible joints, and points, semi-circles, pencil and penholders, rulers, etc., etc. All the pieces in No. 2 are finished in brass and steel; those in No. 3 are German-silver and steel. The pieces are the same in each, but No. 3 is of extra beauty and workmanship. 18 subscribers at $1 50 each secures No. 2, and 22 at $1 50 each, No. 3.

Nos. 4, 5, 6, 7—Pocket Knives.—Here's for the boys and girls. These premiums are among the most pleasing and useful that we have ever offered. Every boy, and girl too, wants a pocket knife. We give them an opportunity to obtain a most valuable one for merely a little effort. These knives are from Messrs. Patterson Bros. No. 4 is a neat, substantial knife, with three blades and buck-horn handle. No. 5 is a still finer article, with four blades and buck-horn handle. No. 6 is an elegant knife, with four blades and shell handle. No. 7 is a lady's pocket-knife, a beautiful article, with four blades and shell handle.

Nos. 8, 9, 10, 11, 12, 13—American Table Cutlery.—We are glad to be able to offer really good articles of American manufacture, such as are competing successfully with the best foreign goods. ***Messrs. Patterson Bros., 27 Park Row,*** who supply us with these articles, are also importers of English goods. They recommend these knives, manufactured by the ***Meriden Cutlery Co.,*** as equal to any cutlery in the market, and their recommendation is a guarantee wherever they are known. We offer four kinds of knives, and three sizes of each kind. No. 8 have rubber handles, which are actually boiling-water-proof, so that, if they were accidentally to remain in it for several minutes, or even hours, they would not be injured. The blades are of the best steel, and warranted Dessert size, with forks, sold at $14. For 23 subscribers at $1 50, or 78 at $1, we will give either the medium size or the table size, sold at $15 50. No. 9 have ivory handles, are selected with great care, have steel blades, and are beautiful goods. Dessert size, with forks, sold at $18 50. For 31 subscribers, at $1 50, or 100 at $1, we will send the medium size, sold at $20 50. For 34 at $1 50, or 112 at $1, we will send the table size, sold at $22 50. No. 10 are made of solid steel, and are triple plated all over with pure silver, which will wear for a long time, while the knife is actually indestructible by ordinary use. Dessert size, with forks, sold at $22. For 37 subscribers, at $1 50, or 118 at $1, we will give the medium size, sold at $24 50. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25. For 38 at $1 50, or 120 at $1, we will send the table size, sold at $25, No. 11 have steel blades, triple-plated with silver, and larger ivory handles, and are really splendid goods. Dessert size, with forks, sold at $25 50. For 42 subscribers, at $1 50, or 128 at $1, we will give the medium size, sold at $28. For 45 subscribers at $1 50, or 143 at $1, we will give the table size sold at $30 50. The forks, which accompany these premiums, Nos. 8, 9, 10, are made of genuine albata, and warranted double-plated with coin-silver. The forks with No. 11 are warranted triple-plated with coin-silver. These forks are also furnished to us by Messrs. Patterson Bros. The carving-knife and fork, and fluted steel, are made by

the Meriden Cutlery Co., with the best ivory balanced handles.

Nos. 14 to 29—Silverware for the Table.—What would become of elegance and refinement in the furnishing of homes if the ladies (God bless them!) had not such an amiable passion for endlessly beautifying everything around them? Ever since Eve first set out the fruit of Paradise on its broad leaves to entertain the angel guests of Adam, it has been the province of her lovely daughters to spread the social board with attractions still more tempting to the eye than to the palate. What, that becomes a woman, will not a woman do to make her table shine? We condole with them that their means are not always equal to their good taste, and propose that henceforth no lady shall lack a lustrous silver tea-set, or other piece of similar elegance, unless she chooses to. Look at the following premiums, all of the celebrated manufacture of Messrs. HALL, ELTON, & Co., 36 Park Row, New York; No. 28 is silver-plated, gold-lined, beautifully chased **Tea Set** of six pieces, consisting of a coffee-pot, two teapots, a creamer, a sugar-bowl, and a slop-bowl. The style of this set is very neat, new and elegant. Messrs. Hall, Elton & Co, warrant these goods to be their best triple plate. This is a very desirable premium. No. 29 is a tea-set with same number of pieces, triple-plated, plain, new style.

Nos. 31, 32, 33, 34, 35—GOLD PENS, Rubber Mounted with Ever-Pointed Pencils—Pens in Gold and Silver Holders—Pens and Pencils in Extension Cases.—No. 31 has a gold-mounted rubber case, with pencil, and a No. 4 gold pen, manufactured by MABIE, TODD & Co., 180 Broadway, New York. This and the next, No. 32, are, we think, really the best things of the kind manufactured. The fact that hard rubber is used, shows that the gold for the mountings, etc., is of the finest quality, as rubber, on account of the sulphur contained in it, can not be mounted with any other without tarnishing. When closed, the pencil No. 31 is only 5 inches long, (No. 32, 3¼ inches,) but it opens to a length of 5¾ inches. The price for the holder and pencil of No. 31 is $6, pen $2; and of No. 32, or smaller size, $5 for the case, and $1 75 for the pen. Fifteen subscribers will give you the former, or gentleman's size, and 13 the latter, or lady's size. No. 33 is a No. 6 gold pen, with silver or gold-plated holder with an ebony handle—a very neat, desirable business-pen. By describing the kind of pen you prefer, we can probably select one that will suit your hand perfectly. We send these by mail, in a neat turkey morocco box, lined with velvet, in which they can be kept, protected from injury, No. 34 is a large pen, in a fine extension case, round or fluted, and richly engraved. The gold is 14 carats fine. These pens, which are nicely put up in boxes, are a very beautiful thing for a present. Price $20, and sent, postage paid, to any address, upon receipt of 29 subscribers at $1 50 each. No. 35 is a lady's gold pen, with ivory holder. Price, $2 75. This is indeed a very neat and beautiful pen for ladies' use. We send it, postpaid, by mail, inclosed in a handsome velvet-lined morocco box, for 6 subscribers.

No. 38—The Celebrated St. Germain or German Student's Lamp.—as it is sometimes called. This lamp is made and furnished to us by C. F. A. HINRICHS. It scarcely needs eulogium, being the standard thing in our leading colleges, both among students and professors. They reject gas, even where it is most plentiful and convenient, and save their much-worked eyes by the motionless pure white light for which this lamp is so remarkable. No other artificial illumination approaches so nearly to the still colorless sunlight. The secret is in the scientific adaptation of burner and chimney to produce that perfection of draught by which absolute combustion is attained without vibration. The porcelain shade softens the light most agreeably. The lamp slides on a vertical standard, and is adjusted by a set-screw at any desirable elevation to accommodate the work or the eyes. The reservoir is elevated above and at a short distance from the burner, (communicating by a pipe,) so that the oil is always cool and out of reach of flame. The reservoir can be taken out of its telescopic socket, and carried away to another room and filled and returned, without putting out the light. The lamp will be a treasure worth no little trouble to obtain to any one who needs strong light, or who values eye-sight, economy, neatness, pure air, and freedom from trouble and annoyance with lamps; as in all these points it is without a peer. The price of these lamps is $8, with 25 cents for packing. The mineral sperm oil can be had from most respectable dealers, or ordered in packages of any size (1 gallon upward) from Messrs. HENRY RUSSELL & Co., 38 Park Place, New-York.

No. 39—Family Scales.—These scales combining the advantages of counter and platform scales, are peculiarly adapted to household purposes. They weigh from ½ ounce to 240 lbs. They have a scoop or pan for weighing flour, sugar, and other house stores, and a platform for heavier articles, and are just such an apparatus as is needed for in-door or out-door use, occupying less than two feet square. These scales are manufactured by the well-known FAIRBANKS & Co., No. 253 Broadway New York, whose weighing apparatus has long ranked as the standard in all parts of the country. Send to them for circulars, if desired.

Nos. 45-53—Bailey's Patent Planes.—To those who have used these planes and know their value, is but small praise to say that they are superior to any others made. They are so far ahead of any others that there can be no comparison between them. They are self-adjusting in every respect. Both the wood and iron planes are entirely independent in themselves, requiring neither hammer, screw-driver, nor wrench to replace or adjust the cutter, which is held firmly in place and can be instantly released by use of the cam and its thumb-piece. The cutter is adjusted by simply turning a thumb-screw under the bed-piece upon which the plane-iron rests. By this the cutter can be adjusted to any thickness of shaving. The Stanley Rule and Level Co., 55 Chambers Street, New York, warrant these planes to be of the best stock and finish. The various numbers and sizes of these planes which we offer gives carpenters, mechanics, and others desiring them, an opportunity to get a complete set of either the wood or iron planes as premiums. The smooth planes, of which we offer two sizes, are 5¼ inches long, 1¾ inch cutter; and 8 inches long, 1¾ inch cutter.

Jack plane..	....14 in. long, 2	in. cutter.	}	Iron.
Fore "	.....18 " "	2¾ " "		
Jointer "	.....22 " "	2¾ " "		

In the wood planes the lengths and widths of cutter embrace all sizes made. Forty-four subscribers at $ .50 each, or 141 subscribers at $1 each, will get a complete set of the wood-planes. Sixty-nine subscribers at $1.50 will get a complete set of the iron planes, which will last a life-time. If larger sizes than those given are wanted, a few extra subscriptions will be required, according to the difference in the price.

Nos. 54-76—Machinists' Tools.—This series of premiums, consisting of machinists' tools, etc., has been selected and put up at the suggestion of several practical men with whom we have consulted in regard to the subject. These gentlemen, who have a practical knowledge of the tools, and of the requirements of all who have any thing to do with the working of metals, give their unqualified approval of the tools we have selected. This list of premiums has been made so extensive that every man who has any industrial operrtions to carry on will find some tool or tools absolutely necessary to him. By sending us clubs of subscribers to THE MANUFACTURER AND BUILDER these tools may be obtained by the smallest possible amount of labor. Of the qualities of these tools, in point of finish, we know them to be the best in the market—the best, without challenge. When a man has a set of any of them in his tool-chest, he knows he has the means of producing work equal to any that can be done. We obtain these tools from the general agents, Messrs. POST & GODDARD, 109 Liberty Street, New York.

No. 77—Foot-Lathe No. 1.—Of these useful articles we offer two kinds. No. 1 is perfectly adapted for most kinds of turning in wood or metals; also drilling, boring, polishing, sawing, etc. It seems to be the size desired by most people. This is proved by the great numbers of them sold. This lathe takes a piece between centres 19 inches long and 6¼ inches wide in diameter. It weighs 200 pounds. It is fitted with two pointed centres, one spur-centre, face-plate turned and polished, twe rests, one 9 and the other three inches long; also centre key and wrench combined, which fits the screw heads in different parts of the lathe. The balance-wheel weighs 45 pounds, is turned true, and is polished. It has two sizes for change of speed. This size of lathe has a great many extra parts made for it, so that whenever they are wanted they can be obtained. This is a very valuable point, as in buying other machines of the kinds only such things as happen to fit can be used, and they are not always to be found when wanted. The Rev. JOHN TODD, D.D., speaking of lathes, says in regard to these, "For price, for finish, for beauty and workmanship, I have never seen any American lathe so desirable. Of the No. 1 he says: "Nobody can own the lathe without daily gratitude." We procure these lathes through Mr. LUCIUS W. POND, 98 Liberty street, the well-known manufacturer of machinists' tools. Few people can obtain one of these lathes more easily than by obtaining 65 subscribers for THE MANUFACTURER AND BUILDER, for which we ship this premium, without any additional charge for boxing. The regular price is $50. We include leather belt 8 feet long, which costs 90 cents in the price given in the table.

No. 78—Foot Lathe, No. 2.—Our subscribers are frequently asking for second-hand lathes, saying at the same time that such a one would answer their purpose, and probably come cheaper. There are many others who do not care for so complete a lathe as No. 1. The No. 2, we think, will answer this demand. It is made of cheaper materials, but in the same style as lathe No. 1. The frame is of wood, with curved legs, which give it a neat and attractive appearance. It is painted and ornamented in the best style. The bed is made with iron slides three feet long. Will take a piece between centres 21 inchhes long and 6¼ inches in diameter. It has an iron pulley like No. 1. The spindle runs accurately. The face-plate takes off, and the centres are fitted to tapering sockets. Tailstock spindle traverses with a left-hand screw. Everything is well fitted and finished. The balance-whee is the same pattern as for lathe No. 1, and is turned true. The lathe, with face-plate, long and short T rests, two pointed centres, spur-centre, and wrench, packed for transportation, costs $30. For this we also include the leather belt, 8 feet long, which is used on the driving wheel. We box this lathe and deliver it on the cars for a club of 47 subscribers at $1 50 each, or 124 at $1. The twist-drills and chucks—premiums 65, 66, and 69 to 73—especially the smaller sizes, are just the things for these lathes. The chucks, No. Ox, 2 and 3, cost $2 extra for fitting in the lathe. Those desiring further information in regard to the premium may send to WESTERN & Co., 37 Park Row, New York, for an illustrated pamphlet.

No. 79—The Dollar Steam-Engine.—This is a real working steam-engine and boiler, which runs half an hour, or until its fill of water is evaporated, by means of a small spirit-lamp, which forms a part of it. It can not explode or get out of order. A most instructive as well as entertaining toy. Sent, prepaid, for 5 subscribers at $1 50. It is manufactured by COLBY BROTHERS & Co.

Nos. 80, 81, 82, 83—Compact and Powerful Portable Steam-Engine and Boiler.—BAXTER'S patent is acknowledged by many experienced engineers to be the most perfect combination, of standard principles exclusively, and thorough workmanship, ever made in a portable engine. At the same time such is its compactness and the scale and system on which it is manufactured, (by the Colt Armory, at Hartford, Ct.,) that it is afforded at the lowest price ever known for the same (actual) power. It is made by machine tools constructed expressly for it, of standard interchangeable parts throughout, like the celebrated American watches. Consequently we are able to make it one of our most attractive and valuable premiums. Besides, it is warranted to consume less fuel per horse-power than any other engine. This is in consequence, partly, of the improved arrangement of the boiler and the cylinder being entirely let into the steam-space, to save room and heat. The one-horse engine and boiler (which, like the others, will run above, not below rated power) stands but five feet high, over all, by two feet in diameter. This is premium No. 80, costs $300, and can be had for 320 subscribers at $1 50 each, or 1125 at $1 each. The five-horse engine and boiler stands 6¼ feet high by 3 feet in diameter, costs $500, and can be had for 858 subscribers at $1 50 each. The ten-horse engine costs $1200, and will run a good sized manufactory. There is now no reason why any body should be without a first-class steam-engine, especially as these engines are so simple, snug, safe, and economical of fuel that they can be run in any apartment by the fire required to warm it, and by and person of common intelligence, and will be received from the factory in perfect readiness for use. For running small lathes, drills, etc., circular and scroll saws, printing-presses, coru-huskers, cider-mills, fanning-mills, feed-mills, cotton-gins and hullers, cheese-presses, churns, pumps, washing-machines, sewing-machines, rotary blowers for forges and other purposes, etc., the smallest of these engines will be found thoroughly effective, and as little incumbrance and trouble as a kitchen stove. For business, however, we recommend to try for one of ample rather than of bare sufficiency.

Nos. 84, 85, and 86—Steam-Pumps.—These steam-pumps are of the best class and quality, economical in the use of steam, and capable of being applied in various ways. No. 84 is one of Hardick's manufacture, which took the first prize at the Fair of the American Institute a year ago. Nos. 85 and 86 are two sizes of the celebrated Cameron pump. Nos. 1 and 2. The first has a steam cylinder 4¼ by 7 inches, and its capacity of ordinary speed is 15 gallons per minute, and costs $150. Size No. 2 has a steam cylinder 6 inches in diameter, with 8-inch stroke. It costs $200, and is capable at ordinary speed of delivering 30 gallons of water per minute. These pumps are remarkable for their compactness, simplicity, and durability. The valves are large and not liable to become choked up. By simply removing the bonnet, access can be had to them for inspection or repair.

Nos. 105 to 108—To Procuree a Patnt without Money.—We have met with many having valuable inventions, which inventors are anxious to get patented, but are unable to afford the expense, and consequently fail to secure the profits which a patent might produce. To such as are in this position, we make the following liberal offer: No. 108—We will prepare an application for a patent, attend to its passage through the Patent Office, and pay all government fees and incidental expenses attending the same, for any inventor presenting a patentable invention, who will get up a club of seventy-five subscribers for THE MANUFACTURER AND BUILDER for one year at $1,50 each, or 250 at $1 each, and send us the money by post-office order. If this application should be rejected, they may send us an additional list of thirty subscribers at $1.50 each, and the subscription money for the same, on receipt of which we will prepare and prosecute a second application, paying all government fees and incidental expenses. No. 107—For a list of fifty subscribers at $1.50 each, or 150 at $1 each, with the cash accompanying it, we will prepare an application, attend to its passage through the office, and pay the government fee ($15), the applicant paying the second government fee of $20. No. 106—For a list of thirty-five subscribers at $1.50, sent in the same way, we will prepare and prosecute an application, the applicant paying the government fee. No. 105—for twenty-eight subscribers at $1.50 each, or eighty at $1 each, we will prepare and file a caveat, furnish the necessary drawings, (which we also furnish in all the above cases), and pay all government fees. All cases placed in our hands under these arrangements will receive our best attention, equally with those for which our fees have been paid in cash, and will be appealed to the Board of Examiners-in-Chief if necessary, the applicant paying the government fee of $10 on such appeal. If the inventor has no model to accompany his application, he may procure additional subscribers, the premium on which (see cash rates) will enable him to pay for the model. A club of 100 names has been obtained in a single establishment where from 150 to 200 hands are employed. A village of 500 inhabitants will take this number readily.

No. 129—Sewing Machines.—Your choice! A $65 machine for 65 subscribers, at $1.50 each.—It makes no difference to us which machine we send, or whether it is selected at first or at the last moment. No charge for boxing the machines; they go safely as freight. For circulars, giving full particulars in regard to style of machines, fixtures, etc., as well as instructions, send to **Grover & Baker Manufacturing Co., 495** Broadway, New York; **Florence Sewing Machine Co., 505** Broadway, New York; **Wilcox & Gibbs Sewing Machine Co., 658** Broadway, New York; **Singer Sewing Machine Co., 458** Broadway, New York.

Nos. 137, 138—Volumes of the Manufacturer and Builder.—The unbound volumes of THE MANUFACTURER AND BUILDER consist of a set of number for a year, each separate in its own paper cover. These volumes amount to a valuable Library on all matters pertaining to the Industrial Arts, and contain more varied information on manufacturing, building, and mechanical subjects than can be obtained in books costing three times as much. The price of the volumes unbound is $1.50 each, at the office, or $1.75 if sent by mail, as they must be post-paid. They are profusely illustrated, the engravings used in them having alone cost thousands of dollars. For ordinary use, the sets of numbers unbound will answer quite well.

Nos. 139, 140—Bound Volumes of the Manufacturer and Builder.—*New* subscribers almost invariably desire to secure the back numbers of THE MANUFACTURER AND BUILDER from its commencement. Some desire them bound in our uniform style, while others prefer to get the loose numbers and have them bound to suit their own tastes. *Our* binding is very neat, and being done in large quantities at one time, is furnished at a *very cheap* rate. It is moreover very handsome, being of cloth, with gilt title and back, sides embossed and ornamented with a neat architectural device stamped in gold. The price of the volumes is $2.50 each, sent post-paid.

No. 141—Covers for Binding the Manufacturer and Builder.—These are described in premium 139, 140. Now ready for 1869 and 1870. Be careful to state *which year* you require. Any country binder will insert the year's numbers in one of these covers at a moderate cost. Price, 50 cents; sent, *post-paid*, on receipt of three subscribers at $1,50 for each cover.

Nos. 142 to 154—Good Libraries.—In these premiums we offer a choice of books for manufacturers, mechanics, artisans, builders and others. The person entitled to any one of the premiums 142 to 153, may select any books desired from the list published in our Special Premium Sheet, to the amount of the premiums, and the books will be forwarded, post or express paid. $25 or $50 worth of books pertaining to the industrial arts will give the boys new ideas, set them to thinking and observing, and thus enable them to make their heads help their hands. Any good book will, in the end, be of far more value to a youth than to have an extra hundred dollars on coming to manhood. ☞ Let the mechanics of a neighborhood unite their efforts, and through these premiums get an industrial library for general use.

No. 154—General Book Premium.—Any one sending twenty-five or more names may select books from our list to the amount of ten cents for each subscriber sent at $1; or thirty cents for each name sent at $1.20; or sixty cents for each name at $1.50. *This offer is only for clubs of twenty-five or more. The books will be sent by mail or express, prepaid through by us.*

SPECIMEN COPIES, CIRCULARS, SHOW BILLS, etc.,

will be furnished free of charge in sufficient quantities to meet the reasonable requirements of agents. We would respectfully request that they do not waste them, but distribute them judiciously. If some unexpected event should prevent them from continuing in the business, they will do the square thing by us by giving their outfit to some friend, who will continue the business where they have left off; and who will no doubt be grateful for the opportunity of receiving profitable employment.

Postage.

Every subscriber pays his own postage at the office where he receives the paper. This is only twenty-four cents per year, or six cents per quarter, payable in advance.

Don't Give up Your Town

until everybody has been supplied with a circular and has had a chance to subscribe; and be sure that you leave your address, so that they may know where to find you in case they should make up their minds to take the magazine after you have left them. Make all drafts, money-orders, and registered letters payable to the order of Western & Company, publishers, and address all communications

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" " " 15 "	6 00	
" " " 20 "	10 00	
" " " 30 "	16 50	$1 50
" " " 40 "	24 00	4 00
" " " 50 "	32 50	7 50
" " " 75 "	48 75	11 25
" " " 100 "	65 00	15 00
" " " 200 "	140 00	40 0
" " " 500 "	350 00	100 00
" " " 1000 "	700 00	200 00

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" "	10	" "	15	.. 1 20	"	"
" "	15	" "	20	.. 1 10	"	"
" "	20	" "	30	.. 1 00	"	"
" "	30	" "	40	.. 95	"	"
" "	40	" "	50	.. 90	"	"
" "	50	" "	200	.. 85	"	"
" "	200	" "	500	.. 80	"	"
" "	500	" "	1000	.. 80	"	"
" "	1000	and over.....		80	"	"

The Profits of the Cash Business, it will be seen by the above tables, are large and accrue rapidly. Every experienced canvasser knows that it is far easier to obtain 4 subscribers to a paper like THE MANUFACTURER AND BUILDER at $1 50 each than to get 1 subscriber to a high-priced magazine, costing $6. This is more strikingly evident when the fact is taken into consideration that our paper, costing only $1 50, is ACTUALLY SUPERIOR IN EVERY RESPECT TO ANY THING OF THE KIND IN THE COUNTRY COSTING TWICE THAT SUM.

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By authority of the Board of Directors of THE NEW YORK RAILWAY COMPANY, and in conformity with the terms of the Act of Incorporation in that respect, the undersigned Commissioners on Stock Subscriptions give public notice for and on behalf of the Directors, and of such Company, that Books of Subscription for the Capital Stock thereof will be opened on WEDNESDAY, THE TWENTY-EIGHTH DAY OF JUNE instant, at the following places in this city, namely :—

At the Banking House of
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No. 11 Nassau street.

At the Banking House of the
BANK OF THE METROPOLIS,
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The Company is authorized to construct two Viaduct Railways or branches through the City of New York, on the east and west sides thereof, from a common starting point at or near Chambers street, between Broadway and Chatham street; also across the Harlem River and through Westchester County; with power to build additional lines of railway or branches, from time to time, in any part of the City or Westchester County. *The property acquired by the Company is exempted from taxes and assessments during the period allowed for the final completion of the railway in the city.* The Mayor, Aldermen and Commonalty of New York are authorized and directed, with the approval of the Commissioners of the Sinking Fund, to subscribe for **five millions of dollars** of the stock of the Company, whenever one million of dollars thereof has been subscribed for by private parties. *This conditional amount of stock has been wholly subscribed for and taken by the Directors of the Company.* On the completion of either of the lines of railway to the line of Westchester County, the Supervisors of that County are authorized to issue the bonds of the County to such amount as the Supervisors shall deem expedient, to aid in the construction and extension of the railway in and through that County. For the proper equalization of the interest of shareholders who may subscribe and pay in moneys at different times, the Directors are authorized to issue scrip for interest on such payments, payable out of the earnings.

THE TERMS OF SUBSCRIPTION will be as follows: TEN PER CENT. of the amount of Stock subscribed for, to be paid in cash at the time of subscription. The residue to be paid as called for by the Board of Directors, on a notice of thirty days, but no call at any one time to exceed ten per cent.

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The Company reserves the right to close the Subscription Books at any time after the twenty-ninth day of July, 1871.

By order of the Board of Directors,
Alexander T. Stewart, John Jacob Astor, Levi P. Morton, } Commissioners on behalf of the Company.
NEW YORK, June 16, 1871. je27-3t-eow

U. S. PATENT OFFICE,
WASHINGTON, D. C., May 11, 1871.
On the petition of JOSEPH W. BUDD of Midland City, Michigan, Administrator of ISRAEL DODENHOFF, deceased, praying for the extension of a patent granted to the said ISRAEL DODENHOFF, on the 18th day of August, 1857, for an improvement in Raking Apparatus for Harvesters.
It is ordered that the testimony in the case be closed on the 18th day of July next, that the time for filing arguments and the Examiner's report be limited to the 28th day of July next, and that said petition be heard on the 2d day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

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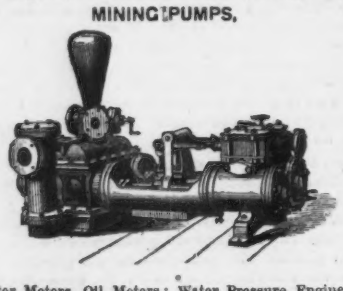

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May 26, 1871.
On the petition of THOMAS J. CHUBB of New York N. Y., praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Separating Ore.
It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extention. M. D. LEGGETT, Commissioner.

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U. S. PATENT OFFICE,
WASHINGTON, D. C., May, 25, 1871.
On the petition of CHARLES H. SAYRE of Utica, New York, praying for the extension of a patent granted to him on the 25th day of August, 1857, for an improvement in Cultivators.
It is ordered that the testimony in the case be closed on the 25th day of July next, that the time for filing arguments and the Examiner's report be limited to the 4th day of August next, and that said petition be heard on the 9th day of August next. Any person may oppose this extension. M. D. LEGGETT, Commissioner.

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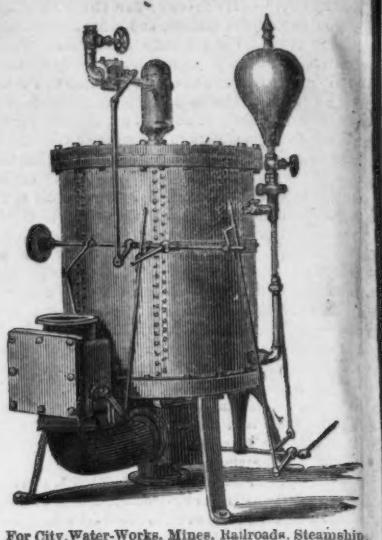

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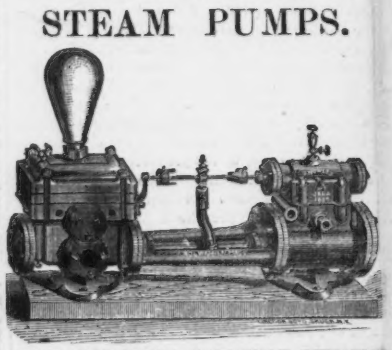

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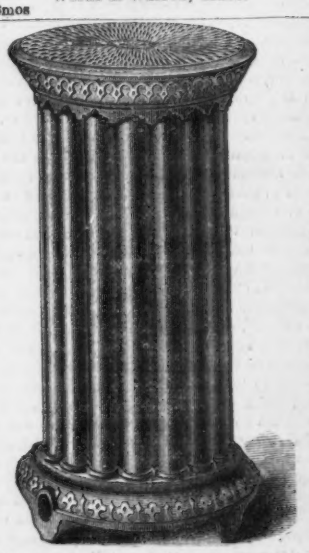

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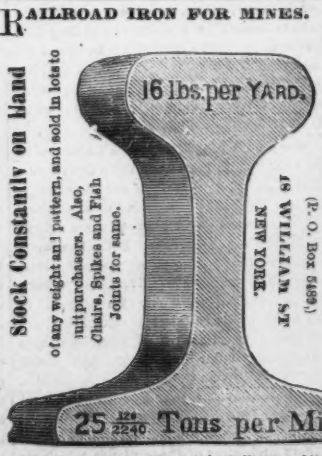

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